National Occupational Standards: Maintenance & Repair – Heavy Vehicle

NOS G1 – Contribute to Housekeeping in Motor Vehicle Environments

NOS Overview

This NOS is about the routine maintenance of the workplace, carrying out basic, non-specialist checks of work tools and equipment, cleaning the work area and using resources economically.

SCOPE OF THIS NOS:

1. **Equipment maintenance** covers
   a. routine checks on work tools and equipment
   b. cleaning work tools and equipment
   c. replacing minor parts
   d. visual inspection of electrical equipment
2. **Housekeeping activities** cover
   a. day to day work area cleaning
   b. clearing away
   c. dealing with spillages
   d. disposal of waste, used materials and debris
3. **Work tools and equipment** are
   a. hand
   b. electrical
   c. mechanical
   d. pneumatic
   e. hydraulic

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the scope of your job responsibilities for the use and maintenance of hand tools, equipment and your work area.
2. workplace policies and schedules for **housekeeping activities** and **equipment maintenance**.
3. the manufacturer's requirements for the cleaning and general, non-specialist maintenance of the tools and equipment for which you are responsible.
4. the regulations and information sources applicable to workshop cleaning and maintenance activities for which you are responsible.
5. the importance of reporting faults quickly to the relevant person.
6. the importance of reporting anticipated delays to the relevant person(s) promptly.

Equipment maintenance

7. how to select and use equipment used for basic hand tool maintenance activities.
8. how to store hand tools safely and accessibly.
9. how to report faulty or damaged **work tools and equipment.**
10. how to work safely when cleaning and maintaining **work tools and equipment**.

General work area housekeeping

11. how to select and use cleaning equipment
12. how to use resources economically.
13. how to use work area cleaning materials and agents.
14. how to clean and maintain the **work tools and equipment** and work areas for which you are responsible.
15. how to dispose of unused cleaning agents, materials and debris.
16. the properties and hazards associated with the use of cleaning agents and materials.
17. the importance of wearing personal protective equipment.
18. the importance of using resources economically and for their intended purpose only.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment throughout all **housekeeping** and **equipment maintenance activities**.
b. select and use cleaning equipment which is:
    - of the right type
    - suitable for the task.
c. use resources economically and for their intended purpose only, following manufacturers' instructions and workplace procedures.
d. follow workplace policies, schedules and manufacturers' instructions when cleaning and maintaining hand tools and equipment.
e. clean the work area(s), for which you are responsible, at the specified time and frequency.
f. carry out **housekeeping activities** safely and in a way which minimises inconvenience to customers and staff.
g. follow the manufacturer's instructions when using cleaning and sanitising agents.
h. ensure your **housekeeping activities** keep your work area clean and free from debris and waste materials.
i. ensure your **equipment maintenance** activities keep your **work tools and equipment** fit for purpose.
j. dispose of used cleaning agents, materials and debris to comply with legal and workplace requirements.
k. store your **work tools and equipment** in a safe manner which permits ease of access and identification for use.
l. report any faulty or damaged tools and equipment to the relevant person(s) clearly and promptly.
m. report any anticipated delays in completion to the relevant person(s) promptly.

NOS G2 – Reduce Risks to Health and Safety in the Motor Vehicle Environment

NOS OVERVIEW

This NOS covers the basic, legally required health and safety duties of everyone in the workplace. It describes the competence required to ensure that:

- our own actions do not create any health and safety risks
- you do not ignore significant risks in your workplace, and
- you take sensible action to put things right, including reporting situations which pose a danger to people in the workplace, and seeking advice from others

This NOS does **not** require you to undertake a full Risk Assessment. It is about having an appreciation of significant risks in the workplace and knowing how to identify them and deal with them.

When you have completed this NOS, you will have proved you can:

1. Identify hazards and evaluate risks in your workplace
2. Reduce the risks to health and safety in your workplace

SCOPE OF THIS NOS:

1. Risks resulting from

a. the use and maintenance of machinery or equipment
b. the use of materials or substances
c. working practices which do not conform to laid down policies
d. unsafe behaviour
e. accidental breakages and spillages
f. environmental factors
g. working at height
h. lifting operations and manual handling
i. incorrect use of personal protective equipment

2. Workplace policies covering

a. the use of safe working methods and equipment
b. the safe use of hazardous substances
c. smoking, eating, drinking and drugs
d. what to do in the event of an emergency
e. personal presentation
f. personal protective equipment
g. lifting operations and manual handling
h. working at height
i. mobile phones and personal stereo equipment

j. ESSENTIAL KNOWLEDGE

You need to understand:

Health and Safety Legislation and Workplace Policies

1. your legal duties for health and safety in the workplace as required by the Health and Safety at Work Act 1974, and any other policies or procedures that govern your working practices.
2. your duties for health and safety as defined by any specific legislation covering your job role.
3. **agreed workplace policies relating to controlling risks to health and safety.**
4. responsibilities for health and safety in your job description.
5. the responsible persons to whom you report health and safety matters.

Risks to Health and Safety

6. what hazards may exist in your workplace, (eg. Slips, trips and falls).
7. health and safety risks which may be present in your own job role and the precautions you must take.
8. the importance of remaining alert to the presence of hazards in the whole workplace.
9. how to deal with and report risks.
10. the importance of dealing with or promptly reporting risks.
11. the requirements and guidance on the precautions.
12. the specific workplace policies covering your job role.
13. suppliers' and manufacturers' instructions for the safe use of equipment, materials and products.
14. safe working practices for your own job role.
15. the importance of personal presentation in maintaining health and safety in the workplace.
16. the importance of personal conduct in maintaining the health and safety of yourself and others.
17. the importance of personal protective equipment, when and where it should be used and the importance of maintaining it correctly.
18. your scope and responsibility for rectifying risks.
19. workplace procedures for handling risks which you are unable to deal with.

PERFORMANCE OBJECTIVES

To be competent you must:

a carry out your working practices in accordance with legal requirements.

b identify the correct personal and vehicle protective equipment required to correctly carry out your workplace practices.

c carry out your workplace practices using the correct personal protective equipment.

d follow the most recent **workplace policies** for your job role.

e rectify health and safety **risks** that are within your capability and scope of your job responsibilities.

f pass on any suggestions for reducing **risks** to health and safety within your job role to the responsible persons.

g ensure your personal conduct in the workplace does not endanger the health and safety of yourself or other persons.

h follow the **workplace policies** and suppliers' or manufacturers' instructions for the safe use of equipment, materials and products.

i report any differences between **workplace policies** and suppliers' or manufacturers' instructions as appropriate.

j ensure your personal presentation at work:

- ensures the health and safety of yourself and others,
- meets any legal duties, and
- is in accordance with workplace policies

NOS G3 – Maintain Working Relationships in the Motor Vehicle Environment

NOS OVERVIEW

This NOS is about maintaining good working relationships with all colleagues in the working environment by using effective communication and support skills.

SCOPE OF THIS NOS:

1. **Colleagues** are
   a. immediate work colleagues
   b. supervisors and managers
2. **Requests for assistance** covering

   a. technical assistance
   b. personal assistance

ESSENTIAL KNOWLEDGE

You need to understand:

Your responsibilities and constraints

1. your own and your colleague's job role and limits of responsibility for giving advice and support.
2. the operational constraints which may affect interaction with colleagues.
3. lines of communication within your workplace.

Communication skills and working relationships

4. how to use suitable and effective spoken communication skills when responding to and interacting with others.
5. how to adapt written and spoken communication methods to satisfy the needs of colleagues.
6. how to report problems using written and spoken methods of communication.
7. the importance of developing positive working relationships with colleagues – the effect on morale, productivity, and company image.
8. the importance of accepting other peoples' views and opinions.
9. the importance of making and honouring realistic commitments to colleagues.

PERFORMANCE OBJECTIVES

To be competent you must:

a. contribute actively to team working by initiating ideas and co-operating with olleagues.
b. respond promptly and willingly to requests for assistance from **colleagues** which fall within the limits of your own job responsibilities and capabilities.
c. where requests fall outside your responsibility and capability, refer colleagues to the relevant person(s).
d. give colleagues sufficient, accurate information and support to meet their work needs.
e. make **requests for assistance** to **colleagues** clearly and courteously.

f. use methods of communication which meet the needs of colleagues.
g. treat colleagues in a way which shows respect for their views and opinions and promotes goodwill.
h. make and keep achievable commitments to **colleagues**
i.. inform colleagues promptly of any problems or information likely to affect their own work.

NOS G4 – Use of hand tools and equipment in Motor Vehicle Engineering

NOS OVERVIEW

This NOS is about the basic use of tools, materials and fabrications relevant to the Automotive Sector.

This NOS is about:
• interpreting information
• adopting safe and healthy working practices
• selecting materials and equipment

This NOS is those working in technical support roles. It is also appropriate for workshop planners.

ESSENTIAL KNOWLEDGE

You must know and understand:
a. The organisational procedures developed to report and rectify inappropriate information and unsuitable resources, and how they are implemented.
b. The types of information, their source and how they are interpreted.
c. The organisational procedures to solve problems with the information and why it is important they are followed.
d. The level of understanding operatives must have of information for relevant, current legislation and official guidance and how it is applied.
e. What the accident reporting procedures are and who is responsible for making the reports.
f. Why and when personal protective equipment (PPE) should be used.
g. Why disposal of waste should be carried out safely and how it is achieved
h. Demonstrate an understanding of material properties
i. Investigate the use of materials and fabrication
k. how to file, fit, tap, thread, cut and drill plastics and metals
how to select and use gaskets, sealants, seals, fittings and fasteners

PERFORMANCE OBJECTIVES

You must be able to:
1. Interpret the given information relating to the work and resources to confirm its relevance
2. Carry out pre-start preparation inspections on power tools and equipment in accordance with approved procedures
3. Carry out operations using power tools and equipment in accordance with safe working practices to achieve the work outcome
4. Identify problems associated with power tools and equipment which need to be referred to authorised personnel
5. Demonstrate work skills to:
    - measure, mark out, file, fit, tap, thread, cut, drill, finish, position and secure.
6. Use and maintain:
    - hand tools
    - ancillary equipment
    - safety aids
7. Disposal of waste in accordance with legislation to maintain a clean work space

8. Checks carried out in accordance with manufacturer's/operator's guidance, legislation and official guidance and
organisational requirements
9. Demonstrate work skills to select correct materials and fabrication for project

NOS G6 – Enable Learning Through Demonstration and Instruction
(Imported ENTO unit L11)

NOS OVERVIEW

This NOS is about demonstrating skills and methods to learners and instructing learners in procedures and processes.

These include; demonstrating how equipment is used, showing a learner how to do something, giving learners instructions on what to do or how to carry out a particular activity, deciding when you should use demonstration or instruction to encourage learning, reviewing the potential use of technology-based learning, checking on the progress of learners and giving feedback to learners.

ESSENTIAL KNOWLEDGE

You need to understand:

The nature and role of demonstrations and instruction

1. the separate areas of demonstrations which encourage learning.
2. which types of learning are best achieved and supported through demonstrations.
3. how to identify and use different learning opportunities.
4. how to structure demonstrations and instruction sessions.
5. how to choose from a range of demonstration techniques.

Principles and concepts

6. how to put learners at their ease and encourage them to take part.
7. how to choose between demonstration and instruction as learning methods.
8. how to identify individual learning needs.
9. which factors are likely to prevent learning and how to overcome them
10. how to check learners' understanding and progress.
11. how to put information in order and decide whether the language you will be using is appropriate.
12. how to choose and prepare appropriate materials, including technology based materials.
13. the separate areas of instructional techniques which encourage learning
14. which types of learning are best achieved and supported through instruction.

External factors influencing human resource development

15. how to make sure everybody acts in line with health, safety and environmental protection l legislation and best practice.
16. how to analyse and use developments in learning and new ways of delivery, including technology-based learning.

PERFORMANCE OBJECTIVES

Demonstrate skills and methods to learners

To be competent you must:

a. base the demonstration on an analysis of the skills needed and the order they must be learned in.
b. ensure that the demonstration is accurate and realistic.
c. structure the demonstration so the learner can get the most out of it.

d. encourage learners to ask questions and get explanation at appropriate stages in the demonstration.
e. give learners the opportunities to practise the skill being demonstrated and give them positive feedback.
f. give extra demonstrations of the skills being taught to reinforce learning.
g. ensure that demonstrations take place in a safe environment and allow learners to see the demonstration clearly.
h. respond to the needs of learners during the demonstration.
i. reduce distractions and disruptions as much as possible.

Instruct learners

To be competent you must:

a. match instruction to the needs of the learners.
b. identify which learning outcomes will be achieved through instruction.
c. ensure that the manner, level and speed of the instruction encourages learners to take part.
d. regularly check that learners understand and adapt instruction as appropriate.
e. give learners positive feedback on the learning experience and the outcomes achieved.
f. identify anything that prevents learning and review this with the learners.

NOS G8 – Identify and Agree the Motor Vehicle Customer Needs

NOS OVERVIEW

This NOS is about: gaining information from customers on their perceived needs; giving advice and information and agreeing a course of action; contracting for the agreed work and completing all necessary records and instructions.

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the fundamental legal requirements of current consumer legislation and the consequences of your own actions in respect of this legislation.
2. the content and limitations of company and product warranties for the vehicles dealt with by your company.
3. the limits of your own authority for accepting vehicles.
4. the importance of keeping customers informed of progress.
5. your workplace requirements for the completion of records.
6. how to complete and process all the necessary documentation.

Customer communication and care

7. How to communicate effectively with, and listen to, customers.
8. how to adapt your language when explaining technical matters to non-technical customers.
9. how to use effective questioning techniques.
10. how to care for customers and achieve customer satisfaction.

Company products and services

11. the range of options available to resolve vehicle problems.
12. the range and type of services offered by your company.
13. the effect of resource availability upon the receipt of customer vehicles and the completion work.
14. how to access costing and work completion time information.

PERFORMANCE OBJECTIVES

To be competent you must:

a. obtain sufficient, relevant information from the customer to make an assessment of their own and perceived vehicle needs.
b. provide customers with accurate, current and relevant advice and information on:
    - suitable vehicle inspection, repair and/or service procedures
    - potential courses of action
    - the implications of courses of action
    - the estimated costs.
c. provide advice and information clearly and in a form and manner which the customer will understand.
d. actively encourage customers to ask questions and seek clarification during your conversation.

e. support the accurate identification and clarification of customer and vehicle needs, by referring to:
    - vehicle data
    - operating procedures.

f. before accepting the vehicle, agree with the customer and record:
    - the extent and nature of the work to be undertaken
    - the terms and conditions of acceptance
    - the cost
    - the timescale.

g. confirm your customer's understanding of the agreement you have made.

h. ensure your recording systems are complete, accurate, in the format required and signed by the customer where necessary.

i. pass all completed records to the next person in the process promptly.

j. gain further customer approval where the contracted agreement is likely to be exceeded.

NOS G11 - Supervisory Skills
(Imported MSC unit D6)

NOS OVERVIEW
This NOS is about ensuring that the work required in your area of responsibility is effectively planned and fairly allocated to individuals and/or teams. It also involves monitoring the progress and quality of the work of individuals and/or teams to ensure that the required level or standard of performance is being met and reviewing and updating plans of work in the light of developments.

The 'area of responsibility' may be, for example, a branch or department or functional area or an operating site within an organisation.

The NOS is recommended for first line managers and middle managers.

Skills
Listed below are the main generic 'skills' which need to be applied in allocating and monitoring the progress and quality of work in your area of responsibility. These skills are explicit/implicit in the detailed content of the NOS and are listed here as additional information.

-
- Communicating
- Consulting
- Decision making
- Delegating
- Information management
- Leadership
- Managing conflict
- Monitoring
- Motivating
- Planning
- Problem solving
- Providing feedback
- Prioritising
- Reviewing
- Setting objectives
- Stress management
- Valuing and supporting others.

ESSENTIAL KNOWLEDGE

You need to know and understand the following:
1. How to select and successfully apply different methods for communicating with people across an area of responsibility.
2. The importance of confirming/clarifying the work required in your area of responsibility with your manager and how to do this effectively.
3. How to identify and take due account of health and safety issues in the planning, allocation and monitoring of work.
4. How to produce a plan of work for your area of responsibility, including how to identify any priorities or critical activities and the available resources.

5. How to identify sustainable resources and ensure their effective use when planning the work for your area of responsibility.
6. The importance of seeking views from people working in your area and how to take account of their views in producing the plan of work.
7. The values, ethics, beliefs, faith, cultural conventions, perceptions and expectations of any team members from a different country or culture and how your own values, ethics, beliefs, faith, cultural conventions, perceptions, expectations, use of language, tone of voice and body language may appear to them.
8. Why it is important to allocate work to individuals and/or teams on a fair basis and how to do so effectively.
9. Why it is important that individuals and/or teams are briefed on allocated work and the standard or level of expected performance and how to do so effectively.
10. The importance of showing individuals and/or teams how their work fits with the vision and objectives of the area and those of the organisation.
11. Ways of encouraging individuals and/or teams to ask questions and/or seek clarification in relation to the work which they have been allocated.
12. Effective ways of regularly and fairly monitoring the progress and quality of work of individuals and/or teams against the standards or level of expected performance.
13. How to provide prompt and constructive feedback to individuals and/or teams.
14. Why it is important to monitor your area for conflict and how to identify the cause(s) of conflict when it occurs and deal with it promptly and effectively How to take account of diversity and inclusion issues when supporting and encouraging individuals and/or teams to complete the work they have been allocated.
15. Why it is important to identify unacceptable or poor performance by individuals and/or teams and how to discuss the cause(s) and agree ways of improving performance with them.
16. The type of problems and unforeseen events that may occur and how to support individuals and/or teams in dealing with them.
17. The additional support and/or resources which individuals and/or teams might require to help them complete their work and how to assist in providing this.
18. How to select and successfully apply different methods for encouraging, motivating and supporting individuals and/or teams to complete the work they have been allocated, improve their performance and for recognising their achievements .
19. How to log information on the ongoing performance of individuals and/or teams and use this information for formal performance appraisal purposes

Industry/sector specific knowledge and understanding

20. Industry/sector requirements for the development or maintenance of knowledge, understanding and skills.
21. Industry/sector specific legislation, regulations, guidelines, codes of practice relating to carrying out work.

PERFORMANCE OBJECTIVES

You must be able to do the following:

1. Confirm the work required in your area of responsibility with your manager and seek clarification, where necessary, on any outstanding points and issues.
2. Plan how the work will be undertaken, seeking views from people in your area of responsibility, identifying any priorities or critical activities and making best use of the available resources.
3. Ensure that work is allocated to individuals and/or teams on a fair basis taking account of skills, knowledge and understanding, experience and workloads and the opportunities for development.

4. Ensure that individuals and/or teams are briefed on allocated work, showing how it fits with the vision and objectives for the area and the overall organisation, and the standard or level of expected performance.
5. Recognise and seek to find out about differences in expectations and working methods of any team members from a different country or culture and promote ways of working that take account of their expectations and maximise productivity.
6. Encourage individuals and/or team members to ask questions, make suggestions and seek clarification in relation to allocated work.
7. Monitor the progress and quality of the work of individuals and/or teams on a regular and fair basis against the standard or level of expected performance and provide prompt and constructive feedback.
8. Support individuals and/or teams in identifying and dealing with problems and unforeseen events.
9. Motivate individual and/or teams to complete the work they have been allocated and provide, where requested and where possible, any additional support and/or resources to help completion.
10. Monitor your area for conflict, identifying the cause(s) when it occurs and dealing with it promptly and effectively.
11. Identify unacceptable or poor performance, discuss the cause(s) and agree ways of improving performance with individuals and/or teams.
12. Recognise successful completion of significant pieces of work or work activities by individuals and/or teams.
13. Use information collected on the performance of individuals and/or teams in any formal appraisals of performance.
14. Review and update plans of work for your area, clearly communicating any changes to those affected.

NOS G12 – Developing Staff
(Imported MSC unit D8)

NOS OVERVIEW
This NOS is about helping members of your team address problems affecting their performance. These may be work-related problems or problems arising from their personal circumstances.

The NOS involves identifying problems affecting people's performance and discussing these in a timely way with the team members concerned to help them find a suitable solution to their problem. Sometimes you may need to refer the team member to specialist support services.

The NOS is recommended particularly for first line managers and middle managers.

Skills
Listed below are the main generic 'skills' which need to be applied in helping team members address problems affecting their performance. These skills are explicit/implicit in the detailed content of the NOS and are listed here as additional information.

- Acting assertively
- Communicating
- Consulting
- Decision-making
- Empathising
- Information management
- Managing conflict
- Monitoring
- Problem solving
- Providing feedback
- Reviewing
- Setting objectives
- Team building
- Valuing and supporting others.

ESSENTIAL KNOWLEDGE

You need to know and understand the following:

a. The importance in giving team members opportunities to approach you with problems affecting their performance.
b. How to encourage team members to approach you with problems affecting their performance.
c. The importance of identifying performance issues and bringing these promptly to the attention of the team members concerned.
d. The importance of discussing problems with team members at a time and place appropriate to the type, seriousness and complexity of the problem.
e. How to gather and check the information you need to identify the problem and its cause.
f. The importance of identifying the problem accurately.
g. The range of alternative courses of action to deal with the problem.
h. The importance of discussing and agreeing with the team member a timely and effective way of dealing with the problem.
i. When to refer the team member to support services or specialists.
j. The importance of keeping a confidential record of your discussions with team members about problems affecting their performance, and how to do so.
k. The importance of ensuring your actions are in line with your organisation's policies for managing people and their performance.

Industry/sector specific knowledge and understanding

l. Industry/sector requirements for helping team members address problems affecting their performance.

Context specific knowledge and understanding

m. The types of problems that your team members may encounter which can affect their performance.
n. Your role, responsibilities and limits of authority when dealing with team members' problems.
o. The range of support services or specialists that exist inside and outside your organisation.
p. Your organisation's policies for managing people and their performance.

PERFORMANCE OBJECTIVES

You must be able to do the following:

1. Give team members opportunities to approach you with problems affecting their performance.
2. Identify performance issues and bring these promptly to the attention of the team members concerned.
3. Discuss problems with team members at a time and place appropriate to the type, seriousness and complexity of the problem.
4. Gather and check information to accurately identify the problem and its cause.
5. Discuss the range of alternative courses of action and agree with the team member a timely and effective way of dealing with the problem.
6. Refer the team member to support services or specialists, where necessary.
7. Keep a confidential record of your discussions with team members about problems affecting their performance.
8. Ensure your actions are in line with your organisation's policies for managing people.

NOS G13 – Business Management
(Imported MSC unit F3)

NOS Overview

This NOS is about managing business processes to make sure the organisation delivers outputs that meet customers' needs and stakeholders' needs, and organisational and legal requirements.

The NOS is recommended for middle managers.

Skills
Listed below are the main generic 'skills' which need to be applied in managing business processes. These skills are explicit/implicit in the detailed content of the NOS and are listed here as additional information.

- Communicating
- Information management
- Analysing
- Assessing
- Presenting information
- Influencing
- Persuading
- Negotiating
- Problem solving
- Prioritising
- Thinking systematically
- Thinking creatively
- Reviewing

ESSENTIAL KNOWLEDGE

You need to know and understand the following:

1. Principles and models of effective process management.
2. How to define business processes.
3. Types of business process measures and how to assess their suitability.
4. How to ensure processes and resources are sustainable and effective in their use, and the importance of doing so.
5. The difference between process outputs and outcomes.
6. How to assess process changes for risk and reward against their potential investment cost.
7. How to carry out cost and benefit analysis.
8. Types of analytical and problem-solving tools that you can use when developing business processes.
9. How to measure the effect of changes in the business process.

Industry/sector specific knowledge and understanding

1. The sector and market in which your organisation works.
2. Relevant sector trends, developments and competitor performance that affect your business processes.

Context specific knowledge and understanding

1. Your organisation's aims and goals.
2. Your organisation's structure, values and culture.

3. How your organisation adds value through delivering its products, services and processes
4. The needs of your actual and potential customers and other key stakeholders.
5. Your organisation's products, services and processes and the interdependencies between them.
6. Measures of process performance that are relevant to your organisation.

PERFORMANCE OBJECTIVES

You must be able to do the following:

1. Design processes that deliver outcomes based on organisational goals and aims.
2. Ensure processes and resources are sustainable and effective in their use.
3. Identify and provide the resources you need.
4. Take account of influences that may affect and shape how processes work.
5. Link processes so that they interact across the organisation to form a complete system.
6. Provide information and support for staff and other stakeholders involved.
7. Define process responsibilities.
8. Develop process measures that are affordable and provide enough information for people to decide how to manage the process.

Establish and use effective methods to review and improve the process.

NOS HV01 – Carry Out Routine Motor Vehicle Maintenance

NOS OVERVIEW

This NOS is about conducting routine examination, adjustment and replacement activities as part of the periodic servicing of vehicles.

KEY WORDS AND PHRASES

Agreed timescales:
Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

Adjustments:
Examples include: adjustments to clearances, gaps, settings, alignment pressures, tensions, speeds and levels, and adjustments to valves, ignition, fuel and emissions, brakes, transmission, lights, tyres, steering and body fittings.

Commercial Vehicles
These are medium and large goods vehicles of 3500kgs gross vehicle mass (GVM) and above.

Components:
Examples include: filters, drive belts, wiper blades, brake linings and pads, lubricants and fluids.

Conformity:
Examples include conformity to manufacturer's specifications, UK and European legal requirements where applicable.

Systems testing equipment:
Examples include: test instruments, emission test equipment, wheel alignment equipment, tyre tread depth gauges.

Maintenance records:
Examples include: records of vehicle inspection, manufacturers', fleet, company or customer job cards.

Major service:
As defined by manufacturers' specifications appropriate to the vehicle being working upon.

Routine vehicle maintenance:
Examples include: conducting scheduled examinations, adjustments, replacements and replenishment of, or to, components and systems in accordance with manufacturer's instructions for the period and/or mileage interval.

Vehicle technical data:
Examples include: hard copy manuals, data on computer and data obtained from on-board diagnostic displays

SCOPE OF THIS NOS:

1. Sources of technical information are:

a. vehicle technical data
b. schedules of inspection
c. regulations

2. Examination methods are:

a. aural
b. visual
c. functional
d. measurements

3. Assessments are for:

a. malfunction
b. damage
c. fluid levels
d. leaks
e. wear
f. security
g. condition and serviceability
h. conformity
i. necessity for adjustment(s)

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the manufacturer's and legal requirements, including O-License criteria, relating to routine maintenance activities for vehicle systems and components.
2. the legal requirements relating to the vehicle maintenance and auxiliary equipment (including road safety requirements).
3. the health and safety legislation and workplace procedures relevant to vehicle maintenance activities and personal and vehicle protection.
4. your workplace procedures for
   - recording vehicle maintenance work and any variations from the original vehicle specification
   - the referral of problems
   - reporting delays to the completion of work
5. the importance of documenting vehicle maintenance information
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time and costs.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Use of technical information

9. how to find, interpret and use **sources of technical information** for scheduled maintenance activities, including on-board diagnostic displays.
10. the importance of using the correct **sources of technical information.**
11. the purpose of and how to use identification codes.

Vehicle system operation

12. how engines, cooling systems, air supply and exhaust systems, fuel systems and ignition systems operate for the type(s) of vehicle on which you are working.
13. how clutch assemblies, clutch operating systems, manual gear boxes, automatic gear boxes, drivelines and hubs (if appropriate) and final drive assemblies operate for the type of vehicle on which you are working.
14. how suspension systems, steering systems, braking systems, non-electrical body systems, wheels and tyres operate for the type of vehicle on which you are working.
15. how batteries, starting systems, charging systems, lighting systems and ancillary equipment operate for the type of vehicle on which you are working.
16. the operating specifications and tolerances for the type(s) of vehicles on which you are working.

Routine maintenance requirements

17. how to conduct scheduled, routine **examination methods** and **assessments** against vehicle specifications to identify damage, corrosion, inadequate fluid levels, leaks, wear, security problems and general condition and serviceability.
18. check and make adjustments to clearances, gaps, settings, alignment, pressures, tension, speeds and levels relevant to the engine area, transmission area, chassis area, electrical area and body (including to valves, ignition, fuel and emissions, brakes, transmission, lights, tyres, steering and body fittings).
19. how to replenish and replace routine service components and materials, including filters, drive, belts, wiper blades, brake linings and pads, lubricants and fluids.
20. how to recognise cosmetic damage to vehicle components and units outside normal service items
21. how to identify codes and grades of lubricants.
22. how to work safely avoiding damage to the vehicle and its systems.

PERFORMANCE OBJECTIVES

To be competent you must:

a. use suitable personal protective equipment and vehicle coverings throughout all vehicle maintenance activities.
b. use suitable **sources of technical and legal information** to support all your vehicle maintenance activities.
c. use the correct specifications and tolerances for the vehicle when making **assessments** of system and component performance.
d. where the customer's vehicle falls outside the manufacturer's original specification, record details accurately and use this adapted specification as the basis for your examination and assessment.
e. examine the vehicle's systems and components following:
    - the manufacturer's approved **examination methods**
    - your workplace procedures
    - health and safety requirements.
f. ensure your **examination methods** identify accurately any vehicle system and component problems falling outside the servicing schedule specified.

g. carry out adjustments, replacement of vehicle components and replenishment of consumable materials following the manufacturer's current specification for:
    - the particular service interval
    - working methods and procedures
    - use of equipment
    - the tolerances for the vehicle.

h. where system adjustments cannot be made within the manufacturer's specification, record the details accurately and take action which complies with the customer's instructions.

i. work in a way which minimises the risk of damage to the vehicle and its systems.

j. use suitable testing methods to evaluate the performance of all replaced and adjusted components and systems accurately, prior to returning the vehicle to the customer.

k. report any problems or issues relating to the vehicle's condition or conformity to the relevant person(s) promptly.

l. ensure your maintenance records are accurate, complete and passed to the relevant person(s) promptly in the format required.

m. complete all vehicle maintenance activities within the agreed timescale.

n. report any anticipated delays in completion to the relevant persons(s) promptly.

NOS HV02 – Remove and Replace Motor Vehicle Engine Units and Components

NOS OVERVIEW

This NOS is about removing and replacing commercial vehicle units and components where dismantling and re-assembly of engine systems is required. It is also about evaluating the performance of replaced units and components. The units and components concerned are those **outside those replaced as part of normal routine, vehicle maintenance (servicing) activities**.

KEY WORDS AND PHRASES

Agreed timescales:
Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

Commercial Vehicles
These are medium and large goods vehicles of 3500kgs gross vehicle mass (GVM) and above.

Units and components:
Any unit or component from the engine system as defined in the Scoping Statement below.

SCOPE OF THIS NOS:

1. **Equipment** is, for example:

    a. hand tools
    b. special workshop tools
    c. general workshop equipment
    d. electrical testing equipment

2. **Testing methods** are:

    a. visual
    b. aural
    c. functional

3. **Unit and components** are

    a. mechanical
    b. electrical

4. **Engine systems** are

    a. engine mechanical systems
    b. cooling systems
    c. air supply and exhaust systems
    d. fuel systems

e. engine electrical systems
f. lubrication systems

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the legal requirements (e.g. European Emission Standards) relating to the vehicle (including road safety requirements).
2. the health and safety legislation and workplace procedures relevant to vehicle maintenance activities and personal and vehicle protection.
3. your workplace procedures for
   - recording removal and replacement information
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of documenting removal and replacement information.
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time and costs.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Use of technical information

8. how to find, interpret and use sources of information applicable to **unit and component** removal and replacement within **engine systems.**
9. the importance of using the correct sources of technical information
10. the purpose of and how to use identification codes.

Electrical and electronic principles

11. vehicle earthing principles and earthing methods.
12. electrical and electronic principles associated with vehicle engine systems, including types of sensors, actuators, their application and operation.
13. types of circuit protection and why these are necessary.
14. electrical safety procedures.
15. how warning, charging and starter circuits work.
16. electric symbols, units and terms.
17. battery charging.
18. electronic/electronic control system principles.

Engine system operation and construction

19. how **engine systems** and their related **units and components** are constructed, dismantled and reassembled for the classification of vehicle worked upon.
20. how **engine systems** and their related **units and components** operate for the classification of vehicle worked upon.

Equipment

21. how to prepare, test and use all the removal and replacement **equipment** required.

Engine unit and component removal and replacement

22. how to remove and replace **engine system** mechanical and electrical units and components for the classification of vehicle worked upon.
23. how to file, fit, tap, thread, cut and drill plastics and metals.
24. how to select and fit gaskets, sealants, fittings and fasteners.
25. how to test and evaluate the performance of replacement engine **units and components** and the reassembled system against the vehicle operating specifications and any legal requirements.

26. the relationship between testing methods and the engine **units and components** replaced – the use of appropriate test methods.
27. the properties of jointing materials and when and where they should be used.
28. the manufacturer's specification for the type and quality of engine **units and components** to be used.
29. how to work safely avoiding damage to other vehicle systems, components and units and contact with leakage and hazardous substances.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment and use vehicle coverings throughout all removal and replacement activities.
b. support your removal and replacement activities by reviewing
    - vehicle technical data
    - removal and replacement procedures
    - legal requirements.
c. prepare, test and use all the **equipment** required following manufacturers' instructions.
d. carry out all removal and replacement activities following;
    - manufacturers' instructions
    - your workplace procedures
    - health and safety requirements.
e. you work in a way which minimises the risk of:
    - damage to other vehicle systems
    - damage to other vehicle components and units
    - contact with leakage
    - contact with hazardous substances.
f. ensure replaced engine **units and components** conform to the vehicle operating specification and any legal requirements.
g. record and report any additional faults you notice during the course of your work promptly.
h. use suitable **testing methods** to evaluate the performance of the reassembled system accurately.
i. ensure the reassembled **engine system** performs to the vehicle operating specification and meets any legal requirements prior to return to the customer.
j. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.
k. complete all removal and replacement activities within the agreed timescale.
l. you report any expected delays in completion to the relevant person(s) promptly.

NOS HV03 - Remove and Replace Commercial Motor Vehicle Electrical Auxiliary Units and Components

NOS OVERVIEW

This NOS is about removing and replacing commercial vehicle units and components previously identified as faulty, damaged, deteriorated or where the customer has requested replacements. It is also about evaluating the performance of replaced units and components. The units and components concerned are those outside those replaced as part of normal routine, vehicle maintenance (servicing) activities.

KEY WORDS AND PHRASES

Agreed timescales:
Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

Comfort and convenience systems
Examples are heated seats, electrically adjusted seats, heated screens, electric mirrors, heating, climate control and air conditioning.

Commercial Vehicles
These are medium and large goods vehicles of 3500kgs gross vehicle mass (GVM) and above.

Units and components:
Any unit or component from the electrical systems defined in the Scoping Statement below.

SCOPE OF THIS NOS:

1. **Equipment** is, for example:

    a. hand tools
    b. special workshop tools
    c. general workshop equipment
    d. electrical meters

2. **Testing methods** are:

    a. visual
    b. aural
    c. functional

3. **Electrical auxiliary units and components** are for

    a. lighting systems
    b. wiper systems
    c. security and alarm systems
    d. comfort and convenience systems

e. audio systems
f. communication systems
g. electric window systems
h. monitoring and instrumentation systems

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the legal requirements relating to the vehicle (including road safety and refrigerant handling requirements).
2. the health and safety legislation and workplace procedures relevant to vehicle maintenance activities and personal and vehicle protection.
3. your workplace procedures for
   - recording removal and replacement information
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of documenting removal and replacement information.
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time and costs.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Use of technical information

8. how to find, interpret and use sources of information applicable to **electrical unit and component** removal and replacement.
9. the importance of using the correct sources of technical information.
10. the purpose of and how to use identification codes.

Electrical auxiliary system operation and construction

11. how **electrical auxiliary units and components** are constructed, removed and replaced for the classification of vehicle worked upon.
12. how **electrical auxiliary units and components** operate for the classification of vehicle worked upon.

Equipment

13. how to prepare, test and use all the removal and replacement **equipment** required.

Electrical and electronic principles

14. vehicle earthing principles and earthing methods.
15. electrical and electronic principles associated with electrical auxiliary systems, including types of sensors and actuators, their application and operation.
16. types of circuit protection and why these are necessary.
17. electrical safety procedures.
18. how lighting, warning, charging and starter circuits work.
19. electric symbols, units and terms.
20. electrical/electronic control system principles.

Electrical unit and component removal and replacement

21. how to remove and replace **electrical auxiliary units and components** for the classification of vehicle worked upon.
22. how to test and evaluate the performance of replacement **electrical auxiliary units and components** and the reassembled system against the vehicle operating specifications and any legal requirements.

23. the relationship between testing methods and the **electrical auxiliary units and components** replaced – the use of appropriate test methods.
24. the manufacturer's specification for the type and quality of **electrical auxiliary units and components** to be used.
25. how to work safely avoiding damage to other vehicle systems, components and units and contact with leakage and hazardous substances.

PERFORMANCE OBJECTIVES

To be competent you must:

l. wear suitable personal protective equipment and use vehicle coverings throughout all removal and replacement activities.
m. support your removal and replacement activities by reviewing
- vehicle technical data
- removal and replacement procedures
- legal requirements.

n. prepare, test and use all the **equipment** required following manufacturers' instructions.
o. carry out all removal and replacement activities following;
- manufacturers' instructions
- your workplace procedures
- health and safety requirements.

p. you work in a way which minimises the risk of:
- damage to other vehicle systems
- damage to other vehicle components and units
- contact with leakage
- contact with hazardous substances.

q. ensure replaced **electrical auxiliary units and components** conform to the vehicle operating specification and any legal requirements.
r. record and report any additional faults you notice during the course of your work promptly.
s. use suitable **testing methods** to evaluate the performance of the reassembled system accurately.
t. ensure the reassembled system performs to the vehicle operating specification and meets any legal requirements prior to return to the customer.
u. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.
v. complete all removal and replacement activities within the agreed timescale.
l. you report any expected delays in completion to the relevant person(s) promptly

NOS HV04 – Remove and Replace Commercial Motor Vehicle Chassis Units and Components

NOS OVERVIEW

This NOS is about removing and replacing commercial vehicle units and components where dismantling and re-assembly of chassis systems is required. It is also about evaluating the performance of replaced units and components. The units and components concerned are those **outside those replaced as part of normal routine, vehicle maintenance (servicing) activities**.

KEY WORDS AND PHRASES

Agreed timescales:
Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

Commercial Vehicles
These are medium and large goods vehicles of 3500kgs gross vehicle mass (GVM) and above.

Units and components:
Any unit or component from the chassis systems defined in the Scoping Statement below.

Functional testing:
Examples include: use of brake roller tester, dynamometer, suspension activation,.

Steering and suspension system:
For the purposes of this unit, this will also include wheels and tyres.

SCOPE OF THIS NOS:

1. **Equipment** is
   a. hand tools
   b. special workshop tools
   c. general workshop equipment
   d. electrical testing equipment

2. **Testing methods** are:
   a. visual
   b. aural
   c. functional

3. **Units and components** are:
   a. mechanical
   b. electrical
   c. hydraulic and fluid
   d. pneumatic
4. **Chassis systems** are

a. steering
b. suspension
c. braking

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the legal requirements relating to the vehicle (including road safety requirements).
2. the health and safety legislation and workplace procedures relevant to vehicle maintenance activities and personal and vehicle protection.
3. your workplace procedures for
   - recording removal and replacement information
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of documenting removal and replacement information.
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time and costs.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Use of technical information

8. how to find, interpret and use sources of information applicable to **unit and component** removal and replacement within **chassis systems.**
9. the importance of using the correct sources of technical information
10. the purpose of and how to use identification codes.

Electrical and electronic principles

11. vehicle earthing principles and earthing methods.
12. electrical and electronic principles associated with chassis systems, including types of sensors and actuators, their application and operation.
13. types of circuit protection and why these are necessary.
14. electrical safety procedures.
15. electric symbols, units and terms.
16. electrical and electronic control system principles.

Chassis system operation and construction

17. how commercial vehicle **chassis systems** and their related **units and components** are constructed, removed and replaced.
18. how commercial vehicle **chassis systems** and their related **units and components** operate.

Equipment

19. how to prepare, test and use all the removal and replacement **equipment** required.

Chassis system unit and component removal and replacement

20. how to remove and replace commercial vehicle **chassis system** mechanical, electrical, hydraulic and pneumatic units and components.
21. how to file, fit, tap, thread, measure and mark out, cut and drill plastics and metals.
22. how to select and use gaskets, sealants, seals, fittings and fasteners.
23. how to test and evaluate the performance of replacement chassis system **units and components** and the reassembled system against the vehicle operating specifications and any legal requirements.
24. the relationship between testing methods and the chassis system **units and components** replaced – the use of appropriate test methods.

25. when replacement units and components must meet the original equipment specification (OES) for warranty or other requirements.
26. how to work safely avoiding damage to other vehicle systems, components and units and contact with leakage and hazardous substances.
27. awareness of health and safety aspects of working on loaded vehicles (e.g. HAZCHEM, load type and capacity)

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment and use vehicle coverings throughout all removal and replacement activities.
b. support your removal and replacement activities by reviewing:
    - vehicle technical data
    - removal and replacement procedures
    - legal requirements.
c. prepare, test and use all the **equipment** required following manufacturers' instructions.
d. carry out all removal and replacement activities following;
    - manufacturers' instructions
    - your workplace procedures
    - health and safety requirements.
e. you work in a way which minimises the risk of:
    - damage to other vehicle systems
    - damage to other vehicle components and units
    - contact with leakage
    - contact with hazardous substances.
f. ensure replaced chassis **units and components** conform to the vehicle operating specification and any legal requirements.
g. record and report any additional faults you notice during the course of your work promptly.
h. use suitable **testing methods** to evaluate the performance of the reassembled system accurately.
i. ensure the reassembled **chassis system** performs to the vehicle operating specification and meets any legal requirements prior to return to the customer.
j. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.
k. complete all removal and replacement activities within the agreed timescale.
l. you report any expected delays in completion to the relevant person(s) promptly.

NOS HV05 – Conduct Pre and Post Work Motor Vehicle Inspections

NOS OVERVIEW

This NOS is about carrying out pre and post work inspections of commercial vehicles using a variety of basic inspection methods and defect recording.

KEY WORDS AND PHRASES

Agreed timescales:
Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

Commercial Vehicles
These are medium and large goods vehicles of 3500kgs gross vehicle mass (GVM) and above.

Sources of technical information:
Examples include inspection schedules, manufacturers' manuals and Trade Association check lists, workplace procedures.

SCOPE OF THIS NOS:

1. **Inspections** are
   a. pre-work
   b. post work

2. **Test methods** are
   a. visual
   b. aural
   c. functional

ESSENTIAL KNOWLEDGE

You need to understand:
Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to conducting pre and post work vehicle inspections and personal and vehicle protection.
2. your workplace procedures for
   - recording pre and post work inspections and any variations from specifications
   - the referral of problems
   - reporting delays to the completion of work
3. the importance of making accurate records of the results of your inspections and interpreting them correctly.
4. the importance of working to agreed timescales and keeping others informed of progress.
5. the relationship between time and costs.
6. the importance of reporting anticipated delays to the relevant person(s) promptly.

Sources of information

7. how to find, interpret and use recommended sources of information, for example tester's manual, driver's handbook.
8. the importance of using recommended sources of information to assist your inspection of vehicles.

Inspection and fault recording methods and the conduct of Inspections

10. how to follow workplace procedures for the systematic pre and post work inspection of vehicles.
11. how to check the basic operation of vehicle systems and vehicle condition
12. how to compare inspection results against vehicle specifications and legal requirements.
13. how to record faults and inspection results in the format required.
14. the importance of discussing findings based upon the results of your inspections to the relevant person(s).

PERFORMANCE OBJECTIVES

To be competent you must:

a. use suitable personal protective equipment throughout all **inspection** activities.
b. use suitable sources of technical information to support your **inspection** activities.
c. carry out systematic vehicle inspections following:
    - your workplace procedures
    - health and safety requirements.
    - the manufacturer's instructions (if appropriate)
d. ensure your comparison of the vehicle against specification accurately identifies any:
    - differences from the vehicle specification
    - vehicle appearance and condition faults
e. work in a way which minimises the risk of damage to the vehicle and its systems, other people and their property.
f. make suitable recommendations for future action based upon the results of your inspections.
g. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.
h. complete all inspection activities within the agreed timescale and to specification.
i. report any anticipated delays in completion to the relevant person(s) promptly.

NOS HV06 – Inspect Commercial Motor Vehicles
NOS OVERVIEW

This NOS is about carrying out a range of inspections of commercial vehicles using a variety of testing methods and equipment.

KEY WORDS AND PHRASES

Agreed timescales:
Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

Commercial Vehicles
These are medium and large goods vehicles of 3500kgs gross vehicle mass (GVM) and above.

Sources of technical information:
Examples include: inspection schedules, mandatory annual test inspection manuals (VOSA) and guides, manufacturers' manuals and trade association check lists, workplace procedures.

SCOPE OF THIS NOS:

All of the items listed below form part of this National Occupational Standard

1. **Vehicle inspections** are
   a. pre-delivery
   b. pre-purchase
   c. pre-VOSA and/or Preventative Maintenance Inspections (PMI)
   d. safety
   e. post-accident

2. **Test methods** are
   a. visual
   b. aural
   c. functional
   d. measurement

3. **Equipment, e.g.**
   a. emissions testing
   b. brake testing
   c. headlamp alignment
   d. wheel alignment
   e. torque setting
   f. specialist diagnostic equipment

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to conducting **vehicle inspections** and personal and vehicle protection.
2. the legislation, including O-licensing, relevant to the types of **vehicle inspections** described in the Scoping Statement for this unit.
3. your workplace procedures for
    - recording **vehicle inspections** and any variations from acceptable tolerances
    - the referral of problems
    - reporting delays to the completion of work
4. the importance of making accurate records of the results of your tests and inspections and interpreting them correctly.
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time, costs and profitability.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Sources of information

8. how to find, interpret and use technical information.
9. the importance of using technical information to inform your inspection and testing of vehicles.

Testing methods and the conduct of Inspections

10. how vehicle systems operate (including the engine area, transmission area, chassis or frame area and electrical area) and the operational tolerances for the vehicle(s) on which you are working.
11. how to follow procedures for the systematic inspection of vehicles.
12. how to test the operation of vehicle systems and vehicle condition, including workshop based and road tests.
13. how to compare test and inspection results against vehicle specifications and legal requirements.
14. how to record test and inspection results in the format required.
15. how to make recommendations based upon the results of your inspections.
16. the implications of failing to carry out an inspection correctly.

PERFORMANCE OBJECTIVES

To be competent you must:

j. use suitable personal protective equipment throughout all **vehicle inspection** activities.

k. use suitable sources of technical and legal information to support your **vehicle inspection** activities.

c. where necessary, confirm that **equipment** has been calibrated to meet manufacturers' and legal requirements.

d. carry out systematic vehicle inspections following:
    - your workplace procedures
    - health and safety requirements.

e. conduct all vehicle testing following:
    - the manufacturer's instructions
    - the recognised **test methods**

- your workplace procedures
- health and safety requirements.

f. ensure your comparison of the vehicle against specification accurately identifies any:
   - differences from the vehicle specification
   - vehicle appearance and condition faults
   - non-compliance with statutory requirements

g. work in a way which minimises the risk of damage to the vehicle and its systems, other people and their property.

h. make suitable recommendations for future action based upon the results of your tests and inspections.

i. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.

j. complete all inspection activities within the agreed timescale and to specification.

k. report any anticipated delays in completion to the relevant person(s) promptly.

NOS HV07 – Diagnose and Rectify Commercial Motor Vehicle Engine and Component Faults

NOS OVERVIEW

This NOS is about diagnosing and rectifying faults occurring in commercial vehicle engine mechanical, electrical and hydraulic and fluid systems.

KEY WORDS AND PHRASES

Agreed timescales:
Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

Commercial Vehicles
These are medium and large goods vehicles of 3500kgs gross vehicle mass (GVM) and above.

Diagnostic information
This relates to mechanical condition, including wear, run out, pressures and compressions, flow, leakage and electrical measurements such as voltage and pulse displays, electronic systems data, including fault codes, sensor measurements and control unit outputs and/or signals.

Engine Area
Engine mechanical, cooling systems, electronic ignition, petrol fuel injection, diesel fuel injection, lubrication, engine management systems, exhaust gas re-circulation and starting/charging.

Engine and component faults
These are faults that require a two or more step diagnostic activity using a prescribed process or format to identify the cause.

Functional testing
Examples include: performance testing and road testing where relevant.

Hydraulic and fluid systems
These are fuels, oil, lubrication, cooling,etc..

Recommendations
Examples include: servicing, dismantling for further inspection and test, repair and replacement.

SCOPE OF THIS NOS:

1. **Faults** occur within
   a. the engine mechanical system
   b. the engine electrical and electronic systems
   c. the engine hydraulic and fluid systems

2. **Diagnostic methods** are
   a. measurement

b. functional testing
c. electrical and electronic systems testing

3. Equipment is
a. diagnostic and rectification equipment for engine mechanical systems
b. diagnostic and rectification equipment for engine electrical systems
c. diagnostic and rectification equipment for engine hydraulic and fluid systems
d. specialist repair tools
e. general workshop equipment

4. Rectification activities are:
a. dismantling
b. replacement of units and components
c. adjustment of units and components
d. repairs to wiring and connectors
e. re-programming vehicle systems
f. reassembly
g. functional testing

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying engine faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - recording diagnostic and **rectification activities**
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of, documenting diagnostic and rectification information.
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time, costs and profitability.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

8. electrical and electronic principles associated with engine systems, including types of sensors and actuators, their application and operation
9. how electrical and electronic engine systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
10. the interaction between electrical, electronic and mechanical components with vehicle engine systems
11. electrical symbols, units and terms.
12. electrical safety procedures.

Use of diagnostic and rectification equipment

13. how to prepare and test the accuracy of diagnostic testing equipment.
14. how to use diagnostic and rectification **equipment** for engine mechanical, electrical, electronic, hydraulic and fluid systems; specialist engine repair tools and general workshop equipment

Engine electrical faults, their diagnosis and correction

15. how engine mechanical, electrical, electronic and hydraulic and fluid systems are constructed, operate, dismantled and reassembled.
16. the types and causes of engine mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures.
17. engine mechanical, electrical, electronic and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
18. how to find, interpret and use sources of information on engine electrical and electronic operating specifications, diagnostic test procedures, repair procedures and legal requirements.
19. vehicle operating specifications for limits, fits and tolerances relating to engine mechanical, electrical, electronic and hydraulic and fluid systems for the vehicle(s) on which you work.
20. how to select the most appropriate diagnostic testing method for the symptoms presented.
21. how to carry out systematic diagnostic testing of engine mechanical, electrical and electronic, hydraulic and fluid systems using a prescribed process or format and the **diagnostic methods** listed in the Scoping Statement for this unit.
22. how to assess the condition evident within mechanical, electrical, electronic, hydraulic and fluid components and units.
23. how to interpret test results and vehicle data in order to identify the location and cause of vehicle system faults.
24. how to carry out the **rectification activities** listed in the Scoping Statement for this unit in order to correct faults in the engine mechanical, electrical, electronic and hydraulic and fluid systems.
25. the relationship between test methodology and the faults repaired – the use of appropriate testing methods
26. how to make cost effective recommendations for rectification.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment and use vehicle coverings when using **diagnostic methods** and carrying out **rectification activities**.
b. support the identification of **faults**, by reviewing vehicle:
    - technical data
    - diagnostic test procedures.
c. prepare, connect and test all the required **equipment** following manufacturers' instructions prior to use.
d. use **diagnostic methods** which are relevant to the symptoms presented.
e. collect sufficient diagnostic information in a systematic way to enable an accurate diagnosis of engine system faults.
f. identify and record any system deviation from acceptable limits accurately.
g. ensure your assessment of dismantled sub-assemblies, components and units identifies their condition and suitability for repair or replacement, accurately.
h. inform the relevant person(s) promptly where repairs are uneconomic or unsatisfactory to perform.
i. use the **equipment** required, correctly and safely throughout all **rectification activities**.
j. carry out all **rectification activities** following:
    - manufacturers' instructions

- your workplace procedures
- health and safety requirements.

k. work in a way which minimises the risk of :
   - damage to other vehicle systems
   - damage to other components and units
   - contact with leakages
   - contact with hazardous substances.

l. ensure all repaired and replaced components and units conform to the vehicle operating specification and any legal requirements.

m. when necessary, adjust components and units correctly to ensure that they operate to meet system requirements.

n. record and report any additional faults you notice during the course of work promptly.

o. use testing methods which are suitable for assessing the performance of the system rectified.

p. ensure the engine system rectified performs to the vehicle operating specification and any legal requirements prior to return to the customer.

q. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.

r. complete all system diagnostic activities within the agreed timescale.

s. report any anticipated delays in completion to the relevant person(s) promptly.

NOS HV08 – Diagnose and Rectify Commercial Motor Vehicle Chassis System Faults

NOS OVERVIEW

This NOS is about diagnosing and rectifying faults occurring within commercial vehicle steering and suspension systems, braking systems and other systems fitted to commercial vehicle chassis.

KEY WORDS AND PHRASES

Agreed timescales:
Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

Chassis or Frame Area
Suspension systems, assisted steering systems, non-assisted steering systems, braking systems, ABS/traction control, wheels and tyres.

Commercial Vehicles
These are medium and large goods vehicles of 3500kgs gross vehicle mass (GVM) and above.

Chassis system faults
These are faults that require a two or more step diagnostic activity using a prescribed process or format to identify the cause.

Diagnostic information
This relates to mechanical condition, including wear, run out, pressures, flow, leakage and electrical measurements such as voltage and pulse displays, electronic systems data, including fault codes, sensor measurements and control unit outputs and/or signals.

Functional testing
Examples include: brake roller testing, performance testing and road testing where relevant.

Hydraulic and fluid systems
Examples are: hydraulic braking systems, hydro-pneumatic suspension systems, power steering, hydraulic load handling and or moving systems.

Pneumatic systems
Examples are pneumatic braking systems, pneumatic suspension systems, pneumatic control systems.

Recommendations
Examples include: servicing, dismantling for further inspection and test, repair and replacement.

SCOPE OF THIS NOS:

1. **Chassis systems** are
   a. steering

b. suspension
c. braking

2. Diagnostic methods are
a. measurement
b. functional testing
c. electrical and electronic systems testing

3. Equipment is
a. diagnostic and rectification equipment for chassis mechanical systems
b. diagnostic and rectification equipment for chassis electrical systems
c. diagnostic and rectification equipment for chassis hydraulic and fluid systems
d. diagnostic and rectification equipment for chassis pneumatic systems
e. specialist repair tools
f. general workshop equipment

4. Faults are:
a. mechanical
b. electrical and electronic
c. hydraulic and fluid
d. pneumatic

5. Rectification activities are:
a. dismantling
b. replacement of units and components
c. adjustment of units and components
d. repairs to wiring and connectors
e. re-programming vehicle systems
f. reassembly
g. functional testing
h. repairs to air line and connectors

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying chassis faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - recording diagnostic and **rectification activities**
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of, documenting diagnostic and rectification information.
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time, costs and profitability.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

8. electrical and electronic principles associated with chassis systems, including types of sensors and actuators, their application and operation.
9. how electrical and electronic chassis systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
10. the interaction between electrical, electronic and mechanical components within vehicle chassis systems.
11. electrical symbols, units and terms.
12. electrical safety procedures.

Use of diagnostic and rectification equipment

13. how to prepare and test the accuracy of diagnostic testing equipment.
14. how to use diagnostic and rectification **equipment** for chassis mechanical, electrical, hydraulic and fluid systems, specialist repair tools and general workshop equipment

Chassis faults, their diagnosis and correction

15. how chassis mechanical, electrical, electronic, pneumatic and hydraulic and fluid systems are constructed, dismantled, reassembled and operate.
16. the types and causes of chassis mechanical, electrical, electronic, pneumatic and hydraulic and fluid system component and unit faults and failures
17. chassis mechanical, electrical, electronic, pneumatic, hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
18. how to find, interpret and use sources of information on chassis electrical and electronic operating specifications, diagnostic test procedures, repair procedures and legal requirements.
19. vehicle operating specifications for limits, fits and tolerances relating to chassis mechanical, electrical, electronic, pneumatic and hydraulic and fluid systems for the vehicle(s) on which you work.
20. how to select the most appropriate diagnostic testing method for the symptoms presented.
21. how to carry out systematic diagnostic testing of chassis mechanical, electrical and electronic, pneumatic, hydraulic and fluid systems using a prescribed process or format.
22. how to assess the condition evident within chassis mechanical, electrical, electronic, pneumatic, hydraulic and fluid components and units.
23. how to interpret test results and vehicle data in order to identify the location and cause of vehicle system faults.
24. how to carry out the **rectification activities** listed in the Scoping Statement for this unit in order to correct faults in the chassis mechanical, electrical, electronic, pneumatic and hydraulic and fluid systems.
25. the relationship between test methodology and the faults repaired – the use of appropriate testing methods
26. how to make cost effective recommendations for rectification.

PERFORMANCE OBJECTIVES

To be competent you must:

g. wear suitable personal protective equipment and use vehicle coverings when using **diagnostic methods** and carrying out **rectification activities**.
h. support the identification of **faults**, by reviewing vehicle:
    - technical data
    - diagnostic test procedures.

i. prepare, connect and test all the required **equipment** following manufacturers' instructions prior to use.
j. use **diagnostic methods** which are relevant to the symptoms presented.
k. collect diagnostic information in a systematic way relevant to the diagnostic methods used.
l. collect sufficient diagnostic information to enable an accurate diagnosis of chassis system faults.
m. identify and record any system deviation from acceptable limits accurately.
h. ensure your assessment of dismantled sub-assemblies, components and units identifies their condition and suitability for repair or replacement, accurately.
i. inform the relevant person(s) promptly where repairs are uneconomic or unsatisfactory to perform.
j. use the **equipment** required, correctly and safely throughout all **rectification activities**.
k. carry out all **rectification activities** following:
- manufacturers' instructions
- your workplace procedures
- health and safety requirements.

l. work in a way which minimises the risk of :
- damage to other vehicle systems
- damage to other components and units
- contact with leakages
- contact with hazardous substances.

m. ensure all repaired and replaced components and units conform to the vehicle operating specification and any legal requirements.
n. when necessary, adjust components and units correctly to ensure that they operate to meet system requirements.
o. record and report any additional faults you notice during the course of work promptly.
p. use testing methods which are suitable for assessing the performance of the system rectified.
q. ensure the chassis system rectified performs to the vehicle operating specification and any legal requirements prior to return to the customer.
r. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.
s. complete all system diagnostic activities within the agreed timescale.
t. report any anticipated delays in completion to the relevant person(s) promptly.

NOS HV11 – Overhaul Motor Vehicle Mechanical Units

NOS OVERVIEW

This NOS is about the bench-based overhaul of mechanical units, involving dismantling, assessment, repair, replacement or adjustment of internal components together with re-assembly and testing.

KEY WORDS AND PHRASES

Adjustments
Examples include, adjustments made to clearances, gaps, settings, pressures, tensions, pre-load and speeds.

Agreed timescales
Examples include manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

Assessments
Examples include those for wear, damage, alignment, corrosion, leakage, distortion and balance.

Equipment
Examples include hand tools, pullers and presses, measuring instruments, refurbishment tools, general workshop equipment and special service tools.

Functional testing
This refers to any applicable functional tests carried out after overhaul.

Mechanical units
Examples are: engines, gear boxes, final drives, steering, suspension, chassis assemblies.

Testing methods
As prescribed by the appropriate technical literature.

SCOPE OF THIS NOS:

1. **Overhaul activities** are
   a. dismantling
   b. assessment,
   c. repair
   d. replacement
   e. adjustment of internal components
   f. re-assembly
   g. functional testing

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ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the legal requirements applicable to the units and assemblies overhauled (including road safety requirements).

2. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection.

3. your workplace procedures for

    - recording **overhaul activities**
    - the referral of problems
    - reporting delays to the completion of work

4. the importance of, documenting repair information.
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the importance of reporting any anticipated delays to the relevant person(s) promptly.

Equipment

7. how to prepare, and assess the accuracy and operation of all the overhauling and testing equipment required.
8. how to use all the overhauling and testing equipment required.

Mechanical unit overhauling activities

9. how to find, interpret and use sources of information on overhauling procedures and statutory requirements.
10. how vehicle mechanical units and assemblies operate.
11. how mechanical units and assemblies are constructed, dismantled and reassembled.
12. the possible causes of faults in mechanical units and assemblies units.
13. vehicle operating specification for limits, fits and tolerances and where this information can be sourced.
14. how to assess the condition evident within unit sub-assemblies and components.
15. the cost-benefit relationship between the reconditioning, repair and replacement of components within units.
16. how to carry out **overhauling activities** for the type(s) of unit worked upon.
17. the relationship between test methodology and the faults repaired – the use of appropriate testing methods.
18. how to test and evaluate the performance of overhauled units against the operating specification.
19. how to interpret test results.
20. how to identify the types and causes of mechanical unit and assembly failure.
21. how to make suitable adjustments to components and units.
22. how to work safely avoiding personal injury, damage to components leakage and hazardous substances.

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PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment throughout all **overhauling activities**.
b. use suitable sources of technical information to support your **overhauling activities**.
c. assess and prepare all the equipment required, following manufacturers' instructions, prior to use.
d. use the tools and equipment required correctly and safely throughout all **overhauling activities**.
e. carry out all **overhauling activities** following:
    - the manufacturer's instructions
    - your workplace procedures
    - health and safety requirements.
f. work in a way which minimises the risk of:
    - damage to other components
    - leakages
    - contact with hazardous substances.
g. ensure your assessment of the dismantled unit identifies accurately its condition and suitability for overhaul.
h. inform the relevant person(s) promptly where an overhaul is uneconomic or unsatisfactory to perform.
i. use testing methods which comply with the manufacturer's requirements.
j. when necessary, adjust the unit's components correctly to ensure that they operate to meet the vehicle operating requirements.
k. ensure the overhauled units and assemblies conform to the vehicle operating specification and any legal requirements.
l. ensure your overhaul records are accurate, complete and passed to the relevant person(s) promptly in the format required.
m. complete all **overhauling activities** within the agreed timescale.
n. report any anticipated delays in completion to the relevant person(s) promptly.

NOS HV12 – Remove and Replace Commercial Motor Vehicle Transmission and Driveline Units and Components

NOS OVERVIEW

This NOS is about removing and replacing commercial vehicle units and components where dismantling and re-assembly of transmission and driveline systems is required. It is also about evaluating the performance of replaced units and components. The units and components concerned are those **outside those replaced as part of normal routine, vehicle maintenance (servicing) activities**.

KEY WORDS AND PHRASES

Agreed timescales:
Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

Commercial Vehicles
These are medium and large goods vehicles of 3500kgs gross vehicle mass (GVM) and above.

Units and components:
Any unit or component from the transmission and driveline systems defined in the Scoping Statement below.

Functional testing:
Examples include: dynamometer and transmission stall test.

SCOPE OF THIS NOS:

1. **Equipment** is
   a. hand tools
   b. special workshop tools
   c. general workshop equipment
   d. electrical testing equipment

2. **Testing methods** are:
   a. visual
   b. aural
   c. functional

3. **Units and components** are:
   a. mechanical
   b. electrical
   c. hydraulic and fluid
   d. pneumatic

4. **Transmission and driveline systems** are
   a. gearbox and power take off

b. hubs and bearings
c. driveline shafts
d. clutch
e. final drive

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the legal requirements relating to the vehicle (including road safety requirements).

2. the health and safety legislation and workplace procedures relevant to vehicle maintenance activities and personal and vehicle protection.
3. your workplace procedures for
    - recording removal and replacement information
    - the referral of problems
    - reporting delays to the completion of work
4. the importance of documenting removal and replacement information.
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time and costs.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Use of technical information

8. how to find, interpret and use sources of information applicable to **unit and component** removal and replacement within **transmission and driveline systems.**
9. the importance of using the correct sources of technical information.
10. the purpose of and how to use identification codes.

Electrical and electronic principles

11. vehicle earthing principles and earthing methods.
12. electrical and electronic principles associated with chassis and transmission systems, including types of sensors and actuators, their application and operation.
13. types of circuit protection and why these are necessary.
14. electrical safety procedures.
15. electric symbols, units and terms.
16. electrical and electronic control system principles.

Transmission and driveline system operation and construction

17. how commercial vehicle **transmission and driveline systems** and their related **units and components** are constructed, removed and replaced.
18. how commercial vehicle **transmission and driveline systems** and their related **units and components** operate.

Equipment

19. how to prepare, test and use all the removal and replacement **equipment** required.

Transmission and driveline system unit and component removal and replacement

20. how to remove and replace commercial vehicle **transmission and driveline system** mechanical, electrical, hydraulic and pneumatic units and components.

23. how to test and evaluate the performance of replacement transmission and driveline system **units and components** and the reassembled system against the vehicle operating specifications and any legal requirements.

24. the relationship between testing methods and the transmission and driveline system **units and components** replaced – the use of appropriate test methods.

25. when replacement units and components must meet the original equipment specification (OES) for warranty or other requirements.

26. how to work safely avoiding damage to other vehicle systems, components and units and contact with leakage and hazardous substances.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment and use vehicle coverings throughout all removal and replacement activities.

b. support your removal and replacement activities by reviewing
   - vehicle technical data
   - removal and replacement procedures
   - legal requirements.

c. prepare, test and use all the **equipment** required following manufacturers' instructions.

d. carry out all removal and replacement activities following;
   - manufacturers' instructions
   - your workplace procedures
   - health and safety requirements.

e. you work in a way which minimises the risk of:
   - damage to other vehicle systems
   - damage to other vehicle components and units
   - contact with leakage
   - contact with hazardous substances.

f. ensure replaced transmission and driveline **units and components** conform to the vehicle operating specification and any legal requirements.

g. record and report any additional faults you notice during the course of your work promptly.

h. use suitable **testing methods** to evaluate the performance of the reassembled system accurately.

i. ensure the reassembled **transmission and driveline system** performs to the vehicle operating specification and meets any legal requirements prior to return to the customer.

j. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.

k. complete all removal and replacement activities within the agreed timescale.

l. you report any expected delays in completion to the relevant person(s) promptly.

NOS HV13 – Diagnose and Rectify Commercial Motor Vehicle Transmission and Driveline System Faults

NOS OVERVIEW

This NOS is about diagnosing and rectifying faults occurring within commercial vehicle gearboxes, hubs and bearings, driveline, final drive and clutches.

KEY WORDS AND PHRASES

Agreed timescales:
Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

Commercial Vehicles
These are medium and large goods vehicles of 3500kgs gross vehicle mass (GVM) and above.

Transmission and driveline system faults
These are faults that require a two or more step diagnostic activity using a prescribed process or format to identify the cause.

Diagnostic information
This relates to mechanical condition, including wear, run out, pressures, flow, leakage and electrical measurements such as voltage and pulse displays, electronic systems data, including fault codes, sensor measurements and control unit outputs and/or signals.

Functional testing
Examples include dynamometer, performance testing and road testing where relevant.

Hydraulic and fluid systems
These are commercial vehicle transmission and driveline related hydraulic and fluid systems.

Transmission Area
Clutch assemblies, clutch operating systems, manual and automatic gear boxes (including electronic control), drivelines, hubs and final drive assemblies.

Recommendations
Examples include: servicing, dismantling for further inspection and test, repair and replacement.

SCOPE OF THIS NOS:

1. **Transmission and driveline systems** are
   a. gearbox and power take off
   b. hubs and bearings
   c. driveline shafts
   d. clutch
   e. final drive

2. **Diagnostic methods** are
   a. measurement
   b. functional testing
   c. electrical and electronic systems testing

3. **Equipment** is
   a. diagnostic and rectification equipment for transmission and driveline mechanical systems
   b. diagnostic and rectification equipment for transmission and driveline electrical systems
   c. diagnostic and rectification equipment for transmission and driveline hydraulic and fluid systems
   d. diagnostic and rectification equipment for transmission and driveline pneumatic systems
   d. specialist repair tools
   e. general workshop equipment

5. **Faults** are
   a. mechanical
   b. electrical and electronic
   c. hydraulic and fluid
   d. pneumatic

6. **Rectification activities** are:
   a. dismantling
   b. replacement of units and components
   c. adjustment of units and components
   d. repairs to wiring and connectors
   e. re-programming vehicle systems
   f. reassembly
   g. functional testing
   h. repairs to air line and connectors

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying commercial vehicle transmission and driveline faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - recording diagnostic and **rectification activities**
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of, documenting diagnostic and rectification information.
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time, costs and profitability.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

8. electrical and electronic principles associated with commercial vehicle transmission and driveline systems, including types of sensors and actuators, their application and operation.

9. how commercial vehicle electrical and electronic transmission and driveline systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
10. the interaction between electrical, electronic and mechanical components within commercial vehicle transmission and driveline systems.
11. electrical symbols, units and terms.
12. electrical safety procedures.

Use of diagnostic and rectification equipment

13. how to prepare diagnostic testing equipment.
14. how to use diagnostic and rectification **equipment** for commercial vehicle transmission and driveline mechanical, electrical, hydraulic and fluid systems, specialist repair tools and general workshop equipment

Transmission and driveline faults, their diagnosis and correction

15. how commercial vehicle transmission and driveline mechanical, electrical, electronic, pneumatic and hydraulic and fluid systems are constructed, dismantled, reassembled and operate.
16. the types and causes of commercial vehicle transmission and driveline mechanical, electrical, electronic, pneumatic and hydraulic and fluid system component and unit faults and failures.
17. commercial vehicle transmission and driveline mechanical, electrical, electronic, pneumatic and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
18. how to find, interpret and use sources of information on commercial vehicle transmission and driveline electrical and electronic operating specifications, diagnostic test procedures, repair procedures and legal requirements.
19. vehicle operating specifications for limits, fits and tolerances relating to transmission and driveline mechanical, electrical, electronic, pneumatic, hydraulic and fluid systems for the vehicle(s) on which you work.
20. how to select the most appropriate diagnostic testing method for the symptoms presented.
21. how to carry out systematic diagnostic testing of commercial vehicle transmission and driveline mechanical, electrical and electronic, pneumatic, hydraulic and fluid systems using a prescribed process or format.
22. how to assess the condition evident within commercial vehicle transmission and driveline mechanical, electrical, electronic, pneumatic, hydraulic and fluid components and units.
23. how to interpret test results and vehicle data in order to identify the location and cause of vehicle system faults.
24. how to carry out the **rectification activities** listed in the Scoping Statement for this unit in order to correct faults in commercial vehicle transmission and driveline mechanical, electrical, electronic, pneumatic and hydraulic and fluid systems.
25. the relationship between test methodology and the faults repaired – the use of appropriate testing methods.
26. how to make cost effective recommendations for rectification.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment and use vehicle coverings when using **diagnostic methods** and carrying out **rectification activities**.

b. support the identification of **faults**, by reviewing vehicle:
   - technical data
   - diagnostic test procedures.

c. prepare, connect and test all the required **equipment** following manufacturers' instructions prior to use.

d. use **diagnostic methods** which are relevant to the symptoms presented.

e. collect diagnostic information in a systematic way relevant to the diagnostic methods used.

f. collect sufficient diagnostic information to enable an accurate diagnosis of transmission and driveline system faults.

g. identify and record any system deviation from acceptable limits accurately.

h. ensure your assessment of dismantled sub-assemblies, components and units identifies their condition and suitability for repair or replacement, accurately.

i. inform the relevant person(s) promptly where repairs are uneconomic or unsatisfactory to perform.

j. use the **equipment** required, correctly and safely throughout all **rectification activities**.

k. carry out all **rectification activities** following:
   - manufacturers' instructions
   - your workplace procedures
   - health and safety requirements.

l. work in a way which minimises the risk of :
   - damage to other vehicle systems
   - damage to other components and units
   - contact with leakages
   - contact with hazardous substances.

m. ensure all repaired and replaced components and units conform to the vehicle operating specification and any legal requirements.

n. when necessary, adjust components and units correctly to ensure that they operate to meet system requirements.

o. record and report any additional faults you notice during the course of work promptly.

p. use testing methods which are suitable for assessing the performance of the system rectified.

q. ensure the transmission and driveline system rectified performs to the vehicle operating specification and any legal requirements prior to return to the customer.

r. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.

s. complete all system diagnostic activities within the agreed timescale.

t. report any anticipated delays in completion to the relevant person(s) promptly.

Unit AE06 – Diagnose and Rectify Motor Vehicle Electrical Unit and Component Faults

UNIT OVERVIEW

This unit is about identifying and rectifying electrical faults occurring within a variety of electrical systems.

SCOPE OF THIS UNIT:

1. **Electrical faults** occurring within the following systems:

    a. Infotainment
    b. Comfort and Convenience
    c. Supplementary Restraint Systems (SRS)
    d. Networking Systems
    e. Body Electric Systems

2. **Electrical and electronic testing equipment** covers:

    a. volt meters,
    b. ammeters,
    c. ohmmeters
    d. multimeters
    e. battery testing equipment
    f. dedicated and computer based diagnostic equipment
    g. oscilloscopes

3. **Tools and equipment:**

    a. hand tools
    b. special purpose tools
    c. general workshop equipment

4. **Diagnostic Testing is defined as:**

    a. Verify the fault
    b. Collect further information
    c. Evaluate the evidence
    d. Carry out further tests in a logical sequence
    e. Rectify the problem
    f. Check all systems

5. **Electrical and electronic testing techniques** are:

    a. voltage, resistance and current measuring
    b. frequency measuring

c. visual
d. dedicated and computer based testing

6. Rectification activities are defined as:

a. A suitable repair or replacement of a component(s) that rectifies the fault(s) identified form the diagnostic activities carried out.

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying complex electrical faults.

2. legal requirements relating to the vehicle electrics (including road safety and refrigerant handling requirements).

3. your workplace procedures for

- recording fault location and **correction activities**
- reporting the results of tests.
- the referral of problems
- reporting delays to the completion of work

4. the importance of working to recognised diagnostic procedures and processes and obtaining the correct information for diagnostic activities to proceed

5. the importance of, documenting diagnostic and rectification information.

6. the importance of working to agreed timescales and keeping others informed of progress.

7. the relationship between time, costs and profitability.

8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles, including Ohms Law, voltage, power, current (AC/DC) resistance, magnetism, electromagnetism and electromagnetic induction, digital and fibre optics principles.

10. electrical symbols, units and terms.

11. electrical safety procedures.

12. how electrical and electronic units and components are constructed, dismantled and reassembled.

13. how electrical and electronic units and components operate, including electrical component function, electrical inputs, outputs, voltage/current variation and patterns.

14. the interaction between electrical, electronic and mechanical components within the systems defined.

15. how electrical systems interlink and interact, including multiplexing.

16. the operation of the electrical and electronic systems for electric, hybrid and alternative fuel vehicles (including regenerative braking systems).

Use of electrical testing equipment

17. how to prepare and test the accuracy of diagnostic testing equipment.

18. how to use **electrical and electronic testing equipment** to correctly and safely diagnose electrical faults

Auxiliary equipment electrical faults, their diagnosis and correction

19. the types and causes of electrical system, component and unit faults and failures.

20. electrical component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.

21. how to find, interpret and use sources of information on electrical operating specifications, diagnostic test procedures, repair procedures and legal requirements.

22. how to carry out systematic diagnostic testing of electrical and electronic systems using **electrical testing techniques.**

23. how to select the most appropriate diagnostic testing method for the symptoms presented.

24. how to interpret test results and vehicle data in order to identify the location and cause of vehicle system faults.

25. how to rectify electrical and electronic faults
26. how to make suitable adjustments to components and units.

27. how to make cost effective recommendations for rectification.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment and use vehicle coverings when using **electrical testing techniques** and carrying out **rectification activities**.

b. support the identification of **electrical faults**, by reviewing vehicle:

- technical data
- diagnostic test procedures.

c. prepare, connect and test all the required **electrical and electronic testing equipment** following manufacturers' instructions prior to use.

d. use **electrical and electronic testing techniques** which are relevant to the symptoms presented.

e. collect sufficient diagnostic information in a systematic way to enable an accurate diagnosis of electrical system faults.

- identify and record any system deviation from acceptable limits accurately.
- make cost effective recommendations for rectification based upon your analysis of the diagnostic information gained.

f. use all **tools and equipment** required for your diagnostic and rectification activities, correctly and safely throughout.

g. carry out all **diagnostic & rectification activities** following:

- manufacturers' instructions
- recognised researched repair methods(see guidance document)
- health and safety requirements.

h. work in a way which minimises the risk of :

- damage to other vehicle systems
- damage to other components and units
- contact with leakages
- contact with hazardous substances.

i. ensure all repaired and replaced electrical components and units conform to the vehicle operating specification and any legal requirements.

j. when necessary, adjust components and units correctly to ensure that they operate to meet system requirements.

k. ensure the electrical system rectified performs to the vehicle operating specification and any legal requirements prior to return to the customer.

l. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.

m. complete all diagnostic and rectification activities within the agreed timescale.

n. report any anticipated delays in completion to the relevant person(s) promptly.

NOS HV 14 - Diagnose Faults in Motor Vehicles Where no Prescribed Process or Format is Available

NOS OVERVIEW

This NOS is about devising and implementing strategies to diagnose faults when the application of standard manufacturer diagnostic procedures has failed to reveal the source and cause of problems. You are also required to identify the best course of action to be taken to correct problems.

SCOPE OF THIS NOS:

1. Causes of faults are:

- mechanical
- electrical
- electronic
- hydraulic

2. Faults cover the:

a. vehicle engine area
b. transmission and driveline area
c. chassis system area
d. electrical units and components area

3. Diagnostic methods are:

a. measurement
b. functional testing
c. electrical and electronic systems testing

4. Diagnostic Testing is defined as:

a. Verify the fault
b. Collect further information
c. Evaluate the evidence
d. Carry out further tests in a logical sequence
e. Rectify the problem
f. Check all systems

5. Equipment is

a. diagnostic and rectification equipment for mechanical systems
b. diagnostic and rectification equipment for electrical systems
c. diagnostic and rectification equipment for hydraulic and fluid systems
d. specialist repair tools

e. general workshop equipment

6. Rectification activities are defined as:

A suitable repair, replacement, re-coding or re-programming that rectifies the fault(s) identified form the diagnostic activities carried out.

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying transmission and driveline faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - recording fault location and **correction activities**
   - reporting the results of tests.
   - the referral of problems
   - reporting delays to the completion of work
4. how to formulate and construct your own diagnostic procedures and processes in order for diagnostic activities to proceed
5. the importance of, documenting diagnostic and rectification information.
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time, costs and profitability.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles including types of sensors and actuators, their application and operation.
10. how electrical and electronic vehicle systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
11. the interaction between electrical, electronic and mechanical and hydraulic components within a vehicle.
12. how mechanical, hydraulic and electrical systems interlink and interact, including multiplexing
13. electrical symbols, units and terms.
14. electrical safety procedures.

Use of diagnostic and rectification equipment

15. how to prepare and test the accuracy of diagnostic testing equipment.
16. how to use diagnostic and rectification equipment for mechanical, electrical, hydraulic and fluid systems, specialist repair tools and general workshop equipment

Transmission and driveline faults, their diagnosis and correction

17. how vehicle mechanical, electrical, electronic and hydraulic and fluid systems are constructed, dismantled, reassembled and operate.
18. the types and causes of vehicle mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures
19. vehicle mechanical, electrical and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.

20. how to find, interpret and use sources of information on vehicle mechanical, electrical and hydraulic and fluid system specifications, diagnostic test procedures,repair procedures and legal requirements.
21. vehicle operating specifications for limits, fits and tolerances relating to vehicle mechanical, electrical and hydraulic and fluid systems for the vehicle(s) on which you work.
22. how to select the most appropriate diagnostic testing method for the symptoms presented.
23. how to carry out systematic diagnostic testing of vehicle mechanical, electrical and hydraulic and fluid systems.
24. how to assess the condition of the systems and components within vehicle mechanical, electrical and hydraulic and fluid systems
25. how to interpret, evaluate and analyse test results and vehicle data in order to identify the location and cause of vehicle system faults.

26. how to carry out the **rectification activities** in order to correct faults in the vehicle mechanical, electrical and hydraulic and fluid systems.
28. your workplace procedure, policy and procedure for
    - work carried out under warranty
    - liaising with manufacturers and outside agencies
28. the relationship between test methodology and the faults repaired – the use of appropriate testing methods
29. how to make cost effective recommendations for rectification.

PERFORMANCE OBJECTIVES

To be competent you must ensure that:

a. you wear suitable personal protective equipment and use vehicle coverings throughout all diagnostic related activities in the workshop.
b. you confirm with the relevant people that all standard diagnostic procedures and techniques have been systematically and correctly applied to the vehicle prior to undertaking further work.
c. you analyse all previous system fault information, diagnostic test methods and results correctly to verify the inconclusive results prior to undertaking further work.
d. when necessary, you liaise with the relevant manufacturer's representative to obtain up to date information, advice and guidance relevant to the identified **fault**.
d. use diagnostic methods which are relevant to the symptoms presented.
e. collect diagnostic information in a systematic and structured way which progressively eliminates all possible **causes** of the **fault.**
f. you apply the checks and tests that are most likely to be effective in revealing the **cause** of the **fault**.
g. carry out all diagnostic activities following:
    - your workplace procedures
    - health and safety requirements
h. work in a way which minimises the risk of :
    - damage to other vehicle systems
    - damage to other components and units
    - contact with leakages
    - contact with hazardous substances.
i. use any equipment required, correctly and safely throughout all diagnostic and rectification activities.

j. collect sufficient diagnostic information to enable an accurate diagnosis of the **fault**.
k. you correctly identify the **cause(s)** of the **fault**.
l. identify and record any system deviation from acceptable limits accurately.
m. ensure your assessment of dismantled sub-assemblies, components and units identifies their condition and suitability for repair or replacement, accurately.
n. you make clear recommendations for a suitable course of action to rectify the **fault.**
o. inform the relevant person(s) promptly where repairs are uneconomic or unsatisfactory to perform.
p. you complete all system checks and tests in the most cost and time effective way for the **fault** presented.
q. complete all system diagnostic activities within the agreed timescale.
r. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required
s. you report any anticipated delays in completion to the relevant person(s) promptly.

NOS HV15 - Assist Workshop Operations By Providing Technical Support in Motor Vehicle Environments

NOS OVERVIEW

This NOS is about providing a range of technical support to other workshop colleagues. It includes ensuring technical information is up to date and giving technical advice, instruction and briefings to colleagues.

SCOPE OF THIS NOS:

1. Information, Advice and Guidance may be about any of the following:

- mechanical fault finding
- electrical fault finding
- electronic fault finding
- hydraulic fault finding
- customer handling
- road testing
- time
- tools
- equipment
- materials
- technical information

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying transmission and driveline faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
    - recording fault location and **correction activities**
    - reporting the results of tests.
    - the referral of problems
    - reporting delays to the completion of work
    - gaining up to date technical information and repair methods
4. the importance of working to recognised diagnostic procedures and processes and obtaining the correct information for diagnostic activities to proceed and how to formulate and construct your own diagnostic procedures and processes in order for diagnostic activities to proceed
5. the importance of, documenting diagnostic and rectification information.
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time, costs and profitability.

8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles including types of sensors and actuators, their application and operation.
10. how electrical and electronic vehicle systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
11. the interaction between electrical, electronic and mechanical and hydraulic components within a vehicle.
12. how mechanical, hydraulic and electrical systems interlink and interact, including multiplexing
13. electrical symbols, units and terms.
14. electrical safety procedures.

Use of diagnostic and rectification equipment

15. how to prepare and test the accuracy of diagnostic testing equipment.
16. how to use diagnostic and rectification equipment for mechanical, electrical, hydraulic and fluid systems, specialist repair tools and general workshop equipment

Vehicle faults, their diagnosis and correction

17. how vehicle mechanical, electrical, electronic and hydraulic and fluid systems are constructed, dismantled, reassembled and operate.
18. the types and causes of vehicle mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures
19. vehicle mechanical, electrical and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
20. how to find, interpret and use sources of information on vehicle mechanical, electrical and hydraulic and fluid system specifications, diagnostic test procedures, repair procedures and legal requirements.
21. vehicle operating specifications for limits, fits and tolerances relating to vehicle mechanical, electrical and hydraulic and fluid systems for the vehicle(s) on which you work.
22. how to select the most appropriate diagnostic testing method for the symptoms presented.
23. how to carry out systematic diagnostic testing of vehicle mechanical, electrical and hydraulic and fluid systems.
24. how to assess the condition evident within vehicle mechanical, electrical and hydraulic and fluid
25. how to interpret, evaluate and analyse test results and vehicle data in order to identify the location and cause of vehicle system faults.
26. how to carry out the **rectification activities** in order to correct faults in the vehicle mechanical, electrical and hydraulic and fluid systems.
28. your workplace procedure, policy and procedure for
    - work carried out under warranty
    - liaising with manufacturers and outside agencies
28. the relationship between test methodology and the faults repaired – the use of appropriate testing methods
29. how to make cost effective recommendations for rectification.

Personal Skills

30. give straightforward presentations on technical matters
31. file and store technical information
32. instruct colleagues and demonstrate tasks clearly and correctly
33. conduct effective checks of your colleague's work
34. choose the best action to take when work is not in line with requirements

35. discuss colleagues' work with them in a way that will encourage them to be positive and not lead to conflict
36. give advice and guidance in a way that is appropriate to the colleague you are supporting
37. recognise a training need
38. what might happen if you undermine colleagues' self confidence when correcting mistakes
39. the importance of liaising with your manager when evaluating others' work and giving feedback
40. the importance of continuous development and learning

PERFORMANCE OBJECTIVES

To be competent you must ensure that:

a. vehicle technical information is up to date and accessible to workshop staff.
b. you check staff have the correct technical **resources** to carry out their work.
c. you identify any additional **resources** required correctly and promptly.
d. you report any problems affecting the operation of the workshop to your manager promptly.
e. you respond to requests for technical help and advice promptly and positively.
f. you provide colleagues with clear instruction on
    - product updates
    - technical tasks
    - what the results should be
    - how they should perform tasks and
    - the standard that must be achieved
g. you deliver technical instruction and demonstrations in a manner and at a speed that is appropriate to the individual concerned.
h. you give on-going technical support and advice to colleagues.
i. your support and advice is technically accurate and in line with manufacturers' instructions and your organisation's requirements.
j. you choose the most effective situation for giving support and advice to colleagues.
k. you give colleagues time to consider your response and give further explanation when appropriate, checking they have fully understood.
l. you identify and correct mistakes in a way that supports your colleagues' self confidence and praise them when they perform tasks correctly.
m. you check the work of colleagues at regular intervals and take prompt action to resolve problems.
n. you suggest possible methods for improving the work of colleagues to your manager, when necessary.
o. you carry out your checks in a cost effective and efficient manner that is not detrimental to the smooth running of the workshop.

NOS HV16 - Liaise With Motor Vehicle And Product Manufacturers On Technical Matters

NOS OVERVIEW

This NOS covers obtaining and providing information to and from manufacturers and suppliers for diagnostic activities, warranty activities, repairs and to support product development.

SCOPE OF THIS NOS:

1. Information, Advice and Guidance may be about any of the following:

- mechanical fault finding
- electrical fault finding
- electronic fault finding
- hydraulic fault finding
- customer handling
- road testing
- time
- tools
- equipment
- materials
- technical information

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying transmission and driveline faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
    - recording fault location and **correction activities**
    - reporting the results of tests.
    - the referral of problems
    - reporting delays to the completion of work
    - gaining up to date technical information and repair methods
    - recording contact with suppliers, manufacturers and suppliers
4. the importance of working to recognised diagnostic procedures and processes and obtaining the correct information for diagnostic activities to proceed and how to formulate and construct your own diagnostic procedures and processes in order for diagnostic activities to proceed.
5. the importance of, documenting diagnostic and rectification information.
6. the importance of working to agreed timescales and keeping others informed of progress.

7. the relationship between time, costs and profitability.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles including types of sensors and actuators, their application and operation.
10. how electrical and electronic vehicle systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
11. the interaction between electrical, electronic and mechanical and hydraulic components within a vehicle.
12. how mechanical, hydraulic and electrical systems interlink and interact, including multiplexing
13. electrical symbols, units and terms.
14. electrical safety procedures.

Use of diagnostic and rectification equipment

15. how to prepare and test the accuracy of diagnostic testing equipment.
16. how to use diagnostic and rectification equipment for mechanical, electrical, hydraulic and fluid systems, specialist repair tools and general workshop equipment

Vehicle faults, their diagnosis and correction

17. how vehicle mechanical, electrical, electronic and hydraulic and fluid systems are constructed, dismantled, reassembled and operate.
18. the types and causes of vehicle mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures.
19. vehicle mechanical, electrical and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
20. how to find, interpret and use sources of information on vehicle mechanical, electrical and hydraulic and fluid system specifications, diagnostic test procedures,repair procedures and legal requirements.
21. vehicle operating specifications for limits, fits and tolerances relating to vehicle mechanical, electrical and hydraulic and fluid systems for the vehicle(s) on which you work.
22. how to select the most appropriate diagnostic testing method for the symptoms presented.
23. how to carry out systematic diagnostic testing of vehicle mechanical, electrical and hydraulic and fluid systems.
24. how to assess the condition evident within vehicle mechanical, electrical and hydraulic and fluid.
25. how to interpret, evaluate and analyse test results and vehicle data in order to identify the location and cause of vehicle system faults.
26. how to carry out the **rectification activities** in order to correct faults in the vehicle mechanical, electrical and hydraulic and fluid systems.
28. your workplace procedure, policy and procedure for
    - work carried out under warranty
    - liaising with manufacturers and outside agencies
28. the relationship between test methodology and the faults repaired – the use of appropriate testing methods.
29. how to make cost effective recommendations for rectification.

Personal Skills

41. communicate effectively with manufacturers, managers, colleagues and customers.
42. access the reporting system.
43. process information and compile reports.
44. when it is appropriate to contact the manufacturer and or supplier.

45. the limits of your authority and that of the designated personnel when liaising with the manufacturer or supplier.

PERFORMANCE OBJECTIVES

To be competent you must ensure that:

a. you are aware of current technical developments and information for the vehicles you handle.
b. you seek assistance from manufacturers only when the prescribed diagnostic processes have failed
c. you provide information at the level of detail necessary and in a form and manner which the recipient will understand and accept
d. you report technical problems and quality issues promptly in line with manufacturer's requirements
e. you collect sufficient, detailed information on the vehicle, the problem and action taken prior to contacting the manufacturer
f. requests for information to manufacturers are made clearly and promptly
g. you respond to requests for information from manufacturers within the specified timescale
h. all information received from manufacturers is passed on to the relevant person(s) promptly.
i. you report any anticipated delays in obtaining or providing information to the relevant person(s) promptly
j. your reports and technical information are complete, accurate and in the format required
k. you suggest possible methods for improving the reporting process to your manager, when necessary
l. you carry out your reporting in an effective and efficient manner that is not detrimental to the smooth running of the workshop

NOS HV17 - Provide Diagnostic Equipment And Technical Information System Support in Motor Vehicle Environments

NOS OVERVIEW

This NOS covers the skills and knowledge involved in updating technical information systems and diagnostic equipment. It also includes testing for, and rectifying, equipment and system problems.

SCOPE OF THIS NOS:

1. Causes of faults are:

- mechanical
- electrical
- electronic

2. Faults cover:

- software
- hardware

3. Rectification activities are defined as:

A suitable repair, replacement, re-coding or re-programming that rectifies the fault(s) identified

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - obtaining diagnostic software updates.
   - loading technical information system and diagnostic software to specified destinations.
   - ordering and fitting diagnostic equipment and technical system equipment replacement and spare parts.
   - informing others that a technical / software update has taken place
4. the importance of recording the version number / issue date of the software and updates used.
5. how to effectively solve minor errors in the loading of technical information system and diagnostic software.
6. how to accurately complete product registration procedures.
7. how to set the configuration options.
8. how to identify faults using the self test function(s).

9. how to resolve equipment and technical information system problems using the self test function(s) and external support services.
10. how to access system support services.
11. diagnostic equipment and technical information system software loading instructions.
12. the types and causes of errors that can arise during loading of diagnostic equipment and technical information systems software.

13. the need for correct configuration settings
14. the procedures for reporting problems
15. the legal requirements governing the use of software
16. why the prompt installation of software is important
17. when to apply self test function(s)
18. the importance of advising people of changes to diagnostic equipment functionality promptly
19. the importance of reporting equipment / software faults and failures to the relevant person(s) promptly

PERFORMANCE OBJECTIVES

To be competent you must ensure that:

a. you use safe working practices when dealing with diagnostic equipment and technical information systems.
b. installation of updates is carried out promptly following delivery.
c. you load software correctly following the manufacturer's instructions.
d. you set the configuration options according to
   - manufacturers specification
   - your workplace procedures
   - your workplace preferences
e. you take prompt and effective corrective actions to resolve any errors occurring during the loading of the software within the limits of your workplace responsibilities.
f. when necessary, you complete any specified product registration procedures promptly and accurately.
g. you inform all relevant persons of the completion of the software installation promptly.
h. you advise the relevant people of any new features and changes to existing functionality promptly.
i. in the event of a **fault,** you effectively test the diagnostic equipment and technical information system using the specified self test function(s) to identify the cause and solution
j. you take prompt and effective actions to resolve any identified problems in diagnostic equipment and technical information systems using the self test instructions
k. you contact external support services only when the self test function fails to identify the cause of and solution to problems.
l. you promptly and clearly inform the relevant person(s) of any unresolved loading errors and equipment problems
m. you source alternative diagnostic equipment if equipment has to be sent away for repair
n. you inform the relevant person(s) promptly if equipment has to be sent away for repair.
o. you inform the relevant person(s) promptly if alternative diagnostic equipment needs to be used / sourced.

NOS HV18 - Conduct Diagnostic Consultations With Customers in Motor Vehicle Environments

NOS OVERVIEW

This NOS is about carrying out a diagnostic consultation with customers to investigate their concerns relating to their vehicle. It also includes making recommendations to ensure that the customer's concerns are addressed and explaining the results of diagnostic activities so that customers fully understand what the problem with their vehicle is.

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying transmission and driveline faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
    - recording fault location and **correction activities**
    - reporting the results of tests.
    - the referral of problems
    - reporting delays to the completion of work
    - gaining up to date technical information and repair methods
4. the importance of working to recognised diagnostic procedures and processes and obtaining the correct information for diagnostic activities to proceed and how to formulate and construct your own diagnostic procedures and processes in order for diagnostic activities to proceed
5. the importance of, documenting diagnostic and rectification information.
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time, costs and profitability.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles including types of sensors and actuators, their application and operation.
10. how electrical and electronic vehicle systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
11. the interaction between electrical, electronic and mechanical and hydraulic components within a vehicle.
12. how mechanical, hydraulic and electrical systems interlink and interact, including multiplexing
13. electrical symbols, units and terms.
14. electrical safety procedures.

Use of diagnostic and rectification equipment

15. how to prepare and test the accuracy of diagnostic testing equipment.
16. how to use diagnostic and rectification equipment for mechanical, electrical, hydraulic and fluid systems, specialist repair tools and general workshop equipment

Vehicle faults, their diagnosis and correction

17. how vehicle mechanical, electrical, electronic and hydraulic and fluid systems are constructed, dismantled, reassembled and operate.
18. the types and causes of vehicle mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures
19. vehicle mechanical, electrical and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
20. how to find, interpret and use sources of information on vehicle mechanical, electrical and hydraulic and fluid system specifications, diagnostic test procedures, repair procedures and legal requirements.
21. vehicle operating specifications for limits, fits and tolerances relating to vehicle mechanical, electrical and hydraulic and fluid systems for the vehicle(s) on which you work.
22. how to select the most appropriate diagnostic testing method for the symptoms presented.
23. how to carry out systematic diagnostic testing of vehicle mechanical, electrical and hydraulic and fluid systems.
24. how to assess the condition evident within vehicle mechanical, electrical and hydraulic and fluid.
25. how to interpret, evaluate and analyse test results and vehicle data in order to identify the location and cause of vehicle system faults.
26. how to carry out the **rectification activities** in order to correct faults in the vehicle mechanical, electrical and hydraulic and fluid systems.
27. your workplace procedure, policy and procedure for
    - work carried out under warranty
    - liaising with manufacturers and outside agencies
28. the relationship between test methodology and the faults repaired – the use of appropriate testing methods .
29. how to make cost effective recommendations for rectification.

Personal Skills

30. how to give straightforward presentations on technical matters.
31. how to communicate effectively with and listen to customers.
32. how to present yourself in a positive and professional manner to customers.
33. how to recognise and handle different customer reactions.
34. how to adapt your language when explaining technical matters to customers.
35. how to use effective questioning techniques.
36. how to care for customers and achieve customer satisfaction.
37. your organisation's requirements for personal appearance and conduct when dealing with customers.
38. how successful resolution of customer concerns and problems contributes to customer loyalty and improves relationships.

PERFORMANCE OBJECTIVES

To be competent you must ensure that:

a. you respond to customer's concerns in a positive and friendly manner.
b. you give a positive impression of yourself and your organisation when dealing with customers.
c. you obtain sufficient, detailed information using suitably structured questions.

d. when appropriate, you carry out a suitable road test to obtain further detailed information on, or clarification of, customer's concerns.
e. you provide customers with accurate, current and relevant advice and information on any further investigation(s) needed.
f. you explain the implications of any investigation(s) that may be needed clearly.
g. you give technical advice and information accurately, clearly and in a form and manner which the customer will understand.
h. you make clear and relevant recommendations for the next course of action.
i. you liaise with the customer and or other relevant person(s) to agree the next course of action.
j. when appropriate, you explain to customers the action that has been taken regarding their vehicle clearly.
k. your records are complete, accurate, in the format required and signed by the customer, when necessary.
l. you suggest possible methods for improving the customer care process to your manager, when necessary.