

CHAPTER ONE

1. INSPECTION OF VEHICLE AT LEVEL OF MANUFACTURE

1.1 Introduction

The manufacturing stage is the first and most critical point in the life cycle of a motor vehicle, where inspection and compliance play a vital role. It is at this level that key design, engineering, and environmental control features are implemented. Manufacturers are responsible not only for ensuring the performance and safety of vehicles but also for minimizing their environmental footprint from the outset. This chapter explores the procedures, standards, and technologies used during the manufacturing process to ensure vehicles meet **environmental and safety regulations** before they are released to the market.

1.2 Objectives of Inspection at Manufacturing Stage

The inspection of vehicles during and after manufacturing aims to:

- i. Ensure **compliance with emission standards** and environmental regulations.
- ii. Verify **mechanical safety**, structural integrity, and reliability.
- iii. Validate the proper installation and functionality of **pollution control devices**, such as catalytic converters and particulate filters.
- iv. Detect **defects or malfunctions** that could lead to increased emissions or safety hazards.
- v. Maintain **quality control** in mass production to ensure uniform standards across all units.

1.3 Regulatory Frameworks and Global Standards

Different countries and regions have established regulatory bodies and frameworks to oversee vehicle manufacturing. Examples include:

- i. **United States** – Environmental Protection Agency (EPA) and National Highway Traffic Safety Administration (NHTSA)
- ii. **European Union** – European Emission Standards (e.g., Euro 6, Euro 7)
- iii. **Japan** – Ministry of Land, Infrastructure, Transport and Tourism (MLIT)
- iv. **United Nations** – UNECE Regulations (World Forum for Harmonization of Vehicle Regulations) Manufacturers must ensure that vehicles meet the **environmental and safety standards** set by the destination country or region. Non-compliance can result in fines, recalls, or bans on vehicle sales.

1.4 Emission Control Technologies at the Point of Manufacture

To reduce environmental impact, modern vehicles are equipped with advanced emission control systems during production, including:

- i. **Catalytic Converters** – Convert harmful gases (CO, NO_x, hydrocarbons) into less harmful substances.
- ii. **Diesel Particulate Filters (DPF)** – Trap soot and fine particles in diesel engines.

- iii. **Exhaust Gas Recirculation (EGR)** – Reduces nitrogen oxide (NO_x) emissions.
- iv. **Onboard Diagnostics (OBD)** – Monitors the vehicle's performance, emission systems, and alerts users to failures. Inspection at this stage ensures these systems are correctly installed, tested, and fully operational.

1.5 Quality Control and Testing Procedures

Manufacturers implement various testing and inspection protocols, such as:

- i. **End-of-Line Testing (EOL)** – Every vehicle undergoes a final inspection to check lights, brakes, emissions, and electronic systems.
- ii. **Dynamometer Testing** – Simulates driving conditions to assess fuel efficiency and emission levels.
- iii. **Component Testing** – Tests individual parts such as fuel systems, sensors, and exhaust components.
- iv. **Durability Testing** – Ensures the vehicle meets environmental and performance standards over time.

Random sampling and internal audits are often carried out by the manufacturer, while government agencies may conduct **compliance checks and surprise audits**.

1.6 Role of Certification and Type Approval

Before vehicles can be sold or exported, they must receive **type approval** or certification from relevant authorities. This certifies that the vehicle:

- i. Meets emission and safety standards
- ii. Has passed all required inspections and testing
- iii. Is eligible for mass production and sale in the approved market

Without certification, a vehicle cannot legally enter many markets.

1.7 Environmental Impact of Poor Manufacturing Standards

If vehicles are not properly inspected at the manufacturing stage, the consequences can be severe:

- i. Increased air pollution from excessive emissions
 - ii. Higher fuel consumption and carbon footprint
 - iii. Greater likelihood of mechanical failure and road accidents
 - iv. Costly recalls, loss of brand reputation, and legal consequences
- The **Volkswagen diesel emissions scandal** (also known as "Dieselgate") is a prominent example of how manipulation at the manufacturing level can lead to serious environmental and legal consequences globally.

1.8 Towards Greener Manufacturing

With growing concerns about climate change and urban air pollution, vehicle manufacturers are under increasing pressure to adopt greener practices:

- i. Integration of **electric and hybrid technologies**
- ii. Use of **recyclable materials** and **eco-friendly production** processes
- iii. Compliance with **carbon neutrality goals**. Inspection processes must evolve alongside these trends, ensuring that innovations are not only effective but also compliant with environmental policies.

1.9 Purpose & Importance of Certificate of Conformity

A **Certificate of Conformity (CoC)** is an official document issued by an authorized conformity assessment body confirming that a vehicle (or shipment of vehicles) meets specified technical, safety, and environmental standards. It serves as proof that the vehicle “conforms” to required regulations in the country of import or use. Key reasons why a CoC is important:

- i. It facilitates **customs clearance** by demonstrating regulatory compliance.
- ii. It prevents importation of substandard, unsafe, or highly polluting vehicles.
- iii. It helps enforce **environmental protection** by requiring emission, exhaust, and other standards to be met.
- iv. It offers legal certainty and protection to importers, consumers, and regulatory agencies.
- v. It enables the registration authority to accept the vehicle for registration, licensing, and road use.

In Tanzania, the CoC is integral to the **Pre-Shipment Verification of Conformity (PVoC)** program: vehicles exported to Tanzania must pass conformity assessment before shipment and receive a CoC, which is then used during import clearance.

Failure to present a valid CoC at customs can result in penalties, re-inspection (Destination Inspection), delays, or rejection of the vehicle.

TANZANIA BUREAU OF STANDARDS (TBS) Pre-Export Verification of Conformity (PVoC) Certificate of Conformity Application Form

1. Applicant Information

- **Name of Applicant (Company/Individual):**
[Insert Name]
- **Address:**
[Insert Address]
- **Telephone:**
[Insert Phone Number]
- **Email:**
[Insert Email Address]
- **TIN (Taxpayer Identification Number):**
[Insert TIN]

2. Consignment Details

- **Consignment Reference Number:**
[Insert Reference Number]
 - **Port of Entry into Tanzania:**
[Insert Port Name]
 - **Estimated Arrival Date:**
[Insert Date]
 - **Mode of Transport:**
[] Sea
[] Air
[] Land
-

3. Product Information

- **Product Name:**
[Insert Product Name]
 - **HS Code:**
[Insert HS Code]
 - **Country of Origin:**
[Insert Country]
 - **Intended Use:**
[Insert Intended Use]
 - **Quantity:**
[Insert Quantity]
 - **Brand Name (if applicable):**
[Insert Brand Name]
-

4. Supporting Documents Attached

- ☐ Packing List
 - ☐ Commercial Invoice
 - ☐ Bill of Lading / Airway Bill
 - ☐ Clean Report of Findings (if available)
 - ☐ Test Certificate from Country of Origin
-

5. Declaration

I hereby declare that the information provided above is accurate to the best of my knowledge and belief. I understand that any false information may lead to the rejection of this application.

Signature of Applicant:

[Insert Signature]

Date:

[Insert Date]

For Official Use Only

- **Application Received By:**
[Insert Name]
- **Date Received:**
[Insert Date]
- **Remarks:**
[Insert Remarks]

1.10 Introduction & Purpose Inspection of Vehicle for Certifying Conformity.

The inspection for certifying conformity is the core technical step that validates whether a vehicle meets required safety, environmental, and structural standards as declared by the applicant. Passing this inspection is necessary in order to issue the Certificate of Conformity (CoC), which demonstrates to regulatory and customs authorities that the vehicle “conforms” to the legal standards of the importing / registering country.

This chapter explains, in detail:

- i. the preparations needed before inspection
- ii. the inspection methodology for various systems
- iii. pass / fail criteria, tolerances, and defect classification
- iv. how to record and report findings
- v. what to do in case of defects or rejection
- vi. examples of inspection as applied under Tanzania's TBS 698:2012 and exporting inspection regimes
- vii. The objective is to ensure that the inspection is transparent, reproducible, objective, and aligned with both technical and regulatory expectations.
- viii. Before beginning the detailed inspection, several preparatory actions and checks should be undertaken to make the inspection valid, efficient, and fair.

1.10.1 Document Verification & Matching

- i. Confirm that the submitted vehicle details (VIN, chassis number, engine number, make, model, year) match the physical vehicle.
- ii. Review declarations of modifications or alterations; check whether they are permitted under regulation.
- iii. Check supporting documents (manufacturer's technical sheets, prior test data, emission data, import/export documents).
- iv. Record any discrepancy in identification as a potential reason for rejection or further verification.

1.11 Inspection Facility & Equipment Readiness

- i. Use a designated, authorized inspection facility (inspection station) with required infrastructure (inspection bay, lifts or pits, safety features).
- ii. Ensure that all testing equipment (emissions analyzers, brake testers, alignment rigs, optical headlamp testers, multimeters) is properly calibrated and within verification period.
- iii. Verify that safety measures (ventilation, protective gear, fire suppression equipment) are in place.
- iv. Confirm availability of reference standards, technical manuals, and measurement tolerances.

1.12 Vehicle Preparation

- i. Clean key external and accessible parts (headlights, engine bay, exhaust) to allow clear observation and measurement.
- ii. Warm up the engine to normal operating temperature for emissions testing and stable operation.
- iii. Check fluid levels (oil, coolant, brake fluid), inspect battery condition, ensure tires are inflated to recommended pressures.
- iv. Ensure the vehicle is on a level surface and wheels are straight (for alignment tests).
- v. Perform a basic visual pre-inspection to see obvious failures before detailed measurements. These preparatory actions reduce the risk of false failures due to measurement error or vehicle conditions.

1.13 Inspection of Systems & Components

This section describes how to inspect each major system of the vehicle, what to look for, and how to decide pass / fail or conditional acceptance.

1.13.1 Exterior, Structure & Body

- i. **Frame / Chassis / Body Integrity:** Inspect for cracks, corrosion (especially structural parts), welds, deformations, previous repairs. The frame should maintain alignment and structural soundness.
- ii. **Doors, Hinges & Seals:** Doors and hinges must operate smoothly, fasten properly, seals intact to prevent ingress of exhaust gases or water.
- iii. **Glass, Mirrors & Windows:** Check that windscreen and windows are intact, without cracks in critical vision zones; side/rear mirrors are present and secure; wiper / washer systems operate.
- iv. **Lighting, Signals & Reflectors:** All external lights (headlights, tail lights, brake lights, indicators, side lights, hazard lights, reflectors) must be operational, proper lamp type, correct alignment, and correct brightness.
- v. **External attachments / Accessories:** Bumpers, mudguards, license plate holder, external equipment must be secure, not interfering with safety.

1.13.2 Engine, Fuel & Exhaust Systems

- i. **Engine Operation:** The vehicle should start reliably, idle stably, accelerate smoothly, and not exhibit abnormal noises, vibrations, misfires, or rough running.
- ii. **Leaks & Seals:** Inspect for oil, fuel, coolant, or other fluid leaks from the engine, transmission, cooling or fuel systems.
- iii. **Belts & Hoses:** Belts (timing, drive belts) should have no cracks, frays, or looseness; hoses should be intact and not brittle or leaking.
- iv. **Cooling / Radiator / Thermostat:** The cooling system should maintain normal temperature under load without overheating; radiator, hoses, and caps must be in good condition.
- v. **Exhaust System & Emissions:** The exhaust must be securely mounted, free of leaks, corrosion, and meet emissions limits. Catalytic converters or particulate filters (where applicable) should be intact and not bypassed.
- vi. **Fuel System:** Fuel lines, injectors or carburettors, fuel pump, filter — check for leaks or defects.
- vii. **Transmission & Clutch Operation:** Gear shifting should be smooth, no slipping or grinding, clutch engagement/disengagement proper, no undue noises.

1.13.3 Steering, Suspension & Brakes

- i. **Steering System:** Check for excessive play, binding, correct geometry, worn or damaged tie rods, steering linkage, joints, and power steering (if present).

- ii. **Suspension, Dampers & Linkages:** Inspect shock absorbers, springs, bushings, control arms, linkages for wear, leakage, breakage, and consistency.
- iii. **Wheel Bearings / Hubs:** Check for play, noise, looseness or grinding.
- iv. **Tires & Wheels:** Check for minimal tread depth (as stipulated by regulation), even wear, proper mounting, sidewall integrity, proper inflation.
- v. **Brake System:**
 - o Use brake testers to measure braking force, balance left vs right, overall efficiency.
 - o Inspect brake components: pads, shoes, discs, drums, calipers, hydraulic lines, master cylinder, parking brake.
 - o Parking (hand) brake must hold vehicle within permitted gradient.

1.13.4 Electrical & Safety Systems

- i. **Battery & Charging:** Ensure battery health, secure mounting, charging voltage in correct range, terminals corrosion-free.
- ii. **Wiring, Fuses & Connections:** Inspect wiring harnesses for insulation damage, loose connections, proper routing; verify fuses are correct amp ratings.
- iii. **Instruments & Gauges:** Speedometer, odometer, fuel gauge, warning lights should be functional.
- iv. **Horn, Wipers, Washers:** Confirm operation of horn and wipers / washers.
- v. **Safety Devices:** Seat belts (webbing condition, locking mechanism), airbags (if fitted), child anchor points (if required), fire extinguisher (if mandated), emergency exits (for buses).

1.13.5 Emissions & Environmental Compliance

- i. **Emission / Smoke Testing:** Use a gas analyzer or smoke meter to measure pollutants (CO, HC, NOx, particulate) according to standards.
- ii. **Idle & Acceleration Emissions:** Test emissions under idle and under acceleration / load to ensure compliance.
- iii. **Evaporative / Fuel Vapor System:** If required, check for leaks in vapor systems (evaporative emissions).
- iv. **Noise / Exhaust Sound Levels:** Measure noise levels (if regulation mandates) and check for illegal muffler modifications or bypass.
- v. **Tampering / Bypass Detection:** Inspect for evidence of tampering or removal of emission control devices (e.g. DPF removal, catalytic converter bypass, modified ECU).

1.13.6 Dynamic / Road Tests (if applicable)

- i. Conduct a short road test (if regulations allow) to assess real-world behavior: braking, steering, suspension, engine under load, unusual vibration or noise.
- ii. Note performance under various driving conditions (turns, accelerations, braking).
- iii. Validate that safety-critical systems behave as expected under dynamic load.

1.14 Pass / Fail Criteria, Tolerances & Fault Classification

To maintain fairness and consistency, inspections must use clear, documented criteria. The vehicle must meet all **major** requirements to pass, and any defects must be classified accurately.

- i. **Major Defects (Automatic Fail):** Issues that pose an immediate safety hazard or emission violation (e.g. structural failure, brake failure, excessive emissions).
- ii. **Minor / Moderate Defects:** Issues that reduce the margin of safety or compliance but may be allowable within tolerances (e.g. slight light misalignment, minor wear).
- iii. **Advisory Items:** Items not failing but recommended for maintenance or monitoring.

1.14.1 Tolerances & Thresholds

- i. Emission pollutant limits as defined by national environmental or inspection standards.
- ii. Braking efficiency thresholds (e.g. a vehicle must achieve a minimum percentage of its maximum braking potential).
- iii. Differential braking force tolerances between left and right wheels.
- iv. Minimum tread depth (e.g. 1.6 mm or higher, depending on regulation).
- v. Acceptable steering play or suspension travel thresholds.
- vi. Maximum deviation allowed in headlight alignment, instrument accuracy, etc.
- vii. Inspectors should refer to a technical manual or reference table with approved limits for each measurement.

1.15 Recording, Reporting & Issuance of Recommendation

Once inspection is complete, the results must be documented, and a recommendation given.

1.15.1 Inspection Report / Checklist

- i. Use a standard checklist covering all inspection items.
- ii. For each item, record measurement values, pass/fail, remarks, and photographic evidence (if required).
- iii. Include vehicle identification: VIN, make, model, registration / export number.
- iv. Signature, stamp, date, name or identification of the inspector.
- v. Summary section listing defects classified by severity.

1.15.2 Decision & Recommendation

- i. If all major items pass and no unacceptable defects exist, recommend issuance of a Certificate of Conformity.
- ii. If major defects are found, reject conformity and issue a defect notice.
- iii. If minor defects exist, depending on regulation, one may issue conditional acceptance or require correction.
- iv. Clearly state validity, conditions, retest requirements or limitations.

1.15.3 Re-inspection & Appeal

- i. After rectification of defects, re-inspection can be requested — often only the failed items need retesting.
- ii. Keep records of re-inspections, corrections, rejections.
- iii. Provide a mechanism for appeal or review, where the applicant can contest inspector findings.

CERTIFICATE OF CONFORMITY (CoC)

Certificate No: COC-2025-XXXXX

Date of Issue: DD/MM/YYYY

Issuer:

Manufacturer / Inspection Body: [Name]

Address: [Full Address]

Contact: Tel: [____] Fax: [____]

Name: [Owner / Importer Name]

Address: [Address]

Country: [Country]

Vehicle Details:

Make: [e.g. Toyota]

Model: [e.g. Land Cruiser Prado]

Year of Manufacture: [YYYY]

Vehicle Identification Number (VIN): [VIN-Serial]

Engine Number: [Engine #]

Type / Body Style: [SUV / Saloon / Truck etc.]

Colour: [Colour]

Fuel Type: [Petrol / Diesel / Hybrid / Electric]

Engine Capacity: [cc]

Number of Cylinders: [e.g. 4, 6, 8]

Emission Standard: [e.g. Euro 4 / TZE standard etc.]

Maximum Power Output: [kW / hp]

Chassis Number: [Chassis # if different from VIN]

Compliance Details:

Standard(s) / Regulation(s) against which the vehicle conforms:

- [Standard Name / Number]
- [Emission Limits / Safety Standard etc.]

Date(s) of Testing / Inspection: [DD/MM/YYYY]

Inspection Location: [City, Country / Inspection Facility]

Test Report Reference Number: [Report No.]

Certification Statement:

“This is to certify that the above described vehicle conforms in all respects to the applicable safety, emission, and technical specifications required by [Regulatory Authority Name] and meets the standards required for importation into [Country].”

Authorized Signature:

Name: [Name of authorized person]

Position: [Position / Title]

Signature: _____

Date: DD/MM/YYYY

Official Stamp / Seal: