



Accredited Africa Training Institute for Capacity Development

Unit FO409, Hatfield Plaza · 1122 Burnett St, Hatfield 0028 · Pretoria, Gauteng · South Africa

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COURSE BROCHURE

Demonstrate An Understanding Of Materials And Components Used In Rail Construction And Maintenance Training

Physical Planning and Construction / Civil Engineering Construction

Unit Standard 120025 · NQF Level 2 · 9 Credits · 6 Days

COURSE OVERVIEW

This course equips learners with the knowledge to identify, select, and apply materials and components used in rail construction and maintenance. It focuses on understanding material properties, quality standards, and safety considerations relevant to the South African rail industry. Successful learners will be able to contribute effectively to rail infrastructure projects and maintenance operations.

Category	Physical Planning and Construction
Subfield	Civil Engineering Construction
Unit Standard	120025
Accreditation	SAQA Accredited · NQF Level 2 · 9 Credits
Duration	6 days
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS – verifiable online

LEARNING OUTCOMES

- Identify and describe the properties and applications of common materials used in rail construction and maintenance.
- Select appropriate components for specific rail applications based on technical specifications and safety requirements.
- Apply quality control procedures to ensure materials and components meet industry standards.
- Demonstrate understanding of the relationship between material properties and rail performance.
- Evaluate the suitability of materials and components for different rail environments and conditions.

WHO SHOULD ATTEND

- This course is designed for rail construction and maintenance workers, technicians, and supervisors who need to understand the materials and components used in rail infrastructure.
- It is also suitable for apprentices and learners entering the rail sector.

COURSE OUTLINE

Day 1: Introduction to Rail Construction and Maintenance Materials

- Overview of rail construction and maintenance industry in South Africa.
- Categories of materials: metals, polymers, composites, and aggregates.
- Basic material properties: strength, hardness, durability, and corrosion resistance.
- Safety protocols for handling and storing construction materials.
- Environmental impact and sustainability of material choices.
- Introduction to relevant SANS and SAQA standards.

Day 2: Metallic Materials in Rail Infrastructure

- Types of rail steel: carbon steel, manganese steel, and alloy steels.
- Heat treatment: annealing, quenching, tempering, and normalising.
- Mechanical properties: tensile strength, yield strength, hardness.
- Common defects: cracks, fatigue, corrosion, and wear.
- Non-destructive testing (NDT) methods: ultrasonic, magnetic particle.
- Welding and joining of rail steels.

Day 3: Non-Metallic Materials and Components

- Polymers: polyurethane, nylon, and rubber in pads, insulators, and seals.
- Composites: fiberglass and carbon fiber for lightweight components.
- Concrete: precast sleepers, ballast, and tunnel linings.
- Aggregates: types, grading, and drainage properties.
- Degradation mechanisms: UV exposure, chemical attack, and abrasion.
- Testing methods for non-metallic materials.

Day 4: Track Components and Fastening Systems

- Rail profiles: UIC, BS, and South African standards.
- Sleepers: timber, concrete, and steel – advantages and limitations.
- Fastening systems: clips, bolts, and pads – materials and torque specifications.
- Ballast: material specifications, layer thickness, and maintenance.
- Turnouts and crossings: materials and wear patterns.
- Inspection criteria for rail, sleepers, and fastenings.

Day 5: Material Degradation and Failure Analysis

- Wear mechanisms: abrasive, adhesive, and rolling contact fatigue.
- Corrosion: types (galvanic, pitting, stress corrosion cracking) and prevention.
- Fatigue: initiation, propagation, and fracture.
- Failure analysis methodology: visual, microscopic, and chemical analysis.
- Case studies of rail failures in South Africa.
- Maintenance strategies to mitigate degradation: lubrication, grinding, and replacement.

Day 6: Integration, Standards, and Practical Application

- Material selection criteria: cost, availability, performance, and lifecycle.
- Overview of key standards: SANS 120025, SANS 1389, and ISO 9001.
- Quality control: documentation, traceability, and certification.
- Practical exercise: inspection of sample materials and components.
- Group activity: developing a maintenance plan for a rail section.

- Review of course content and assessment preparation.

ASSESSMENT & CERTIFICATION

Delegates are assessed through exercises and a final test. A mark of **50% or above** earns an **AATICD Certificate of Completion**, issued digitally with a unique verification code. This course carries **9 NQF credits** at **NQF Level 2**.

PRICING (PER DELEGATE, EX-VAT)

Delegates	Training Method	Price per Delegate	Total
1	Online	R 25,600.00	R 25,600.00
1	In-House	R 33,300.00	R 33,300.00
1	On-Campus (Pretoria)	R 38,400.00	R 38,400.00

UPCOMING SESSIONS

Start	End	Method	Venue
03 Aug 2026	10 Aug 2026	On-Campus	Pretoria, South Africa
03 Aug 2026	10 Aug 2026	On-Campus	Lagos, Nigeria
04 Aug 2026	11 Aug 2026	On-Campus	Johannesburg, South Africa
05 Aug 2026	12 Aug 2026	On-Campus	Mauritius
06 Aug 2026	13 Aug 2026	On-Campus	Cape Town, South Africa
07 Aug 2026	14 Aug 2026	On-Campus	Dubai, UAE
10 Aug 2026	17 Aug 2026	On-Campus	Abu Dhabi, UAE
11 Aug 2026	18 Aug 2026	On-Campus	Mauritius

Contact us if no suitable date is listed – on-demand sessions can be arranged for groups.

HOW TO GET A QUOTE OR APPLY

1. **Get an instant quotation online:** visit www.aaticd.co.za, open the page for this course (Unit Standard 120025) and click **Get A Quote / Apply**. Select your training method and number of delegates – your quotation is generated immediately and emailed to you with the course brochure attached.
2. **Apply by email:** send the course title, your preferred training method (Online, In-House or On-Campus Pretoria), the number of delegates and your preferred dates to apply@aaticd.co.za – our team will reply with a formal quotation.
3. **Apply by phone or WhatsApp:** call **+27 12 004 8389** or WhatsApp **+27 65 077 6310** and we will prepare your quotation and reserve your seats.
4. **Confirm your booking:** accept the quotation and settle the invoice. As soon as payment is confirmed your delegates are enrolled and receive their AATICD LMS login details by email, along with joining instructions for their chosen training method.

Group discounts apply automatically – the more delegates you enrol, the lower the price per delegate. No payment is required to request a quotation.

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