

NATIONAL WHEELS USER REQUIREMENT SPECIFICATION

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USER REQUIREMENT SPECIFICATION FOR THE NDT TRAINING AND CERTIFICATION PROGRAM TO BE PROVIDED TO TRANSNET ENGINEERING WHEEL BUSINESS

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HISTORY OF CHANGES

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The following changes are included in this revision:

Pages Affected	Revision #	Release Date	Description of Changes

DOCUMENT CONTROL

Distribution List:	Feroza Hanif - National Wheels Business Manager Gordon Sutherland - National Wheels Quality Manager Ryno Kotze - Principal Engineer PSD Wheels Allucious Mothusi – NDT Specialist
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Related Policy Documents:	
Supporting Templates:	

1. Overview

- 1.1 The Wheel Business is a rail rolling stock wheel refurbishment and assembly business within Transnet Engineering. The business uses various NDT (Non-Destructive Testing) methods within the production process to qualify the various components of the wheel.
- 1.2 The tests are conducted on the wheel-set as part of the incoming inspection for repairable wheels, incoming inspection for new and reclaimed material, in-process and final inspections to certify the rail wheels as safe for use.
- 1.3 The employees that require training conduct the tests. The employees range from technically skilled to unskilled levels on the various workstations. The training is required to up-skill them to ensure good sound practices for conducting the tests.
- 1.4 NDT is critical to the business production processes as it determines acceptance or rejection of new components from suppliers and continued utilization of in-service wheel-sets. There is currently a need within TE Wheel Business to consult or seek services on a contractual basis with an NDT training service provider that is ASNT affiliated and certified. The business works according to the Transnet specification, which clearly stipulates that candidates should be trained to the ASNT: SNT-TC-1A guidance document, and conditionally to ISO 9712.

2. Scope of Work

The training body shall possess the necessary skills, tools and equipment to impart the skill to the selected employees (trainees) within the business. The training body shall have a fully equipped training facility where training will be conducted. The scope of work will include but not limited to the following:

- 2.1 Scheduling of training sessions in conjunction with the Wheel Business National office
- 2.2 Training of the employees on the following NDT methods on Level I and Level II
 - i. Ultrasonic Testing
 - ii. Magnetic Particle Testing
 - iii. Penetrant Testing

- 2.3 Training to be done on theoretical and practical basis for each level per NDT method
- 2.4 Testing and qualification of the trained employees
- 2.5 Issuing of training certificates to the business.
- 2.6 Re-testing of employees in case of module not completed
- 2.7 Certification of candidates as a joint effort with business
- 2.8 Capability to offer Level III training should the need arise
- 2.9 Supply and provision of all necessary or required training material

3. Objectives

- 3.1 The main objective for this contract is to ensure that the business has a capable and certified NDT training service provider that is listed on the Transnet vendor system and contracted as such. The service provider will be compliant to all relevant ASNT requirements plus the relevant transport SETA.
- 3.2 The service provider will be capable to schedule, train, test and qualify all candidates as per the business requirement. The certification of the candidates may then be done as a joint measure with business based on the relevant processes that are used by the candidate in his / her scope as an employee.
- 3.3 Candidates shall fairly be introduced and exposed to the method of NDT for which training is to be rendered before they commence with training. Initial requirements for enrolling candidates shall be based on the recommendation of the ASNT (SNT-TC-1A) together with work exposure of each individual, and most importantly on the educational background
- 3.4 Accreditation to SETA shall also form part of the selection criterion in terms of the training body that will undertake the responsibility of empowering TE wheel business employees with NDT skills.

4. Specifications

Below is brief description of the specific methods of NDT performed in the business

4.1 Penetrant testing (PT)

Wheel business employs penetrant testing as an extension of visual examination to ensure that no products (wheelsets in this case) go out to customers with any

surface breaking defects. Wheel centres are machined in the bore and then visually inspected for any opened indications, marks or spots. Then solvent removable PT is performed when there are areas suspected of having defects. Other areas where PT is performed in on the field side of wheels with evidence of nick marks created by old portal lathe gripping devices. Also PT is performed on motor suspension units (i.e. U-tubes and cannon boxes)

4.2 Magnetic particle inspection (MPI or MT)

Wheel business performs MPI on all new and machined railway axles with fluorescent type inspection. Magnetic particle inspection is also performed on traction gears for gear root cracks, wheels centres with evidence of nick marks on the field side of the rim area. MPI is performed with the utilization of either the electromagnetic yoke or magnetic particle horizontal bench.

4.3 Ultrasonic testing (UT)

Ultrasonic Testing is performed on all wheel centres, tyre and axles from different manufacturing processes (casting or forging). Different wave modes are employed to ensure maximum coverage and accessibility of the component being inspected.

Examples are: –

- Compression wave (zero degrees) testing of new wheels (cast and forged)
- Low angle compression testing of axle (5,5 degrees)
- Shear wave (angle beam; 37 degree) testing of axles (forged)
- Surface wave (wheel fax) scanning of wheels after machining of the tread

5. Performance Measurement Criteria and Compliance

The tender will be adjudicated on the bases of:

- 5.1. ASNT – proof of affiliation
- 5.2. SETA – accreditation with SETA as a recognized training body
- 5.3. Cost – total cost of training per type of NDT per candidate
- 5.4. Lead times – duration of training
- 5.5. Capability and flexibility to train employees on own facilities or at TE site
- 5.6. References – post engagement with contract of this nature
- 5.7. Commercial aspects – alignment to the Transnet PPM requirements plus Ability to register as vendor on Transnet system

6. Duration

6.1 The contract will come into force once signed by both parties and will extend for a period of two years. Thereafter, Transnet Engineering (wheel business) has an option to extend or terminate the agreement for a further service period by giving 30 days written notice.

7. Costing Structure

7.1 The contract will be based on the value that will be driven by the indicative numbers of people to be trained. The total forecast candidates will depend on the approved budget per NDT method per level per annum. This forecast is subject to change based on the skills complement and capability thereof. The costing structure will be based on the table below and excluding VAT:

Note - for the total number of candidates refer to annexure A

#	ITEM	COST per head	Total cost	Training duration
1	Ultrasonic Testing Level I	R	R	
2	Ultrasonic Testing Level II	R	R	
3	Magnetic Particle Testing Level I	R	R	
4	Magnetic Particle Testing Level II	R	R	
5	Penetrate Testing Level I	R	R	
6	Penetrate Testing Level II	R	R	
7	Travelling costs	R	R	

Table 1

All bids to be held firm for a 2/3 months period from the date of submission to allow adjudication of the submission plus negotiations where applicable

8. Payment and Retention Fee

8.1 The service provider will be paid based on the submission of a training register and Results of candidates as governed by a Purchase Order that will be a call-off from the contract.

9. Certification plan

9.1 Table 2 below details the structure to be followed from commencement of the training of The candidates to certification of candidates to level two (2) comparable methods. The Structure can be adopted as is or could be modified as may be agreed upon between TE Wheels and the external training provider.

Table 2:

#	Task name	Duration	Predecessors	Responsible
1	Selection of trainees for initial qualification (NDT level 1)	2 days		NDT rep national wheel
2	Introduction theory	1 week	1	NDT rep national wheel
3	Exposure to application (work on the floor)	6 weeks	2	NDT rep national wheel
4	Organised training to level 1 comparable qualification	15 days (3 weeks - UT) (1 week – PT/MT)	3	outside agency
5	Certification to level 1	2 days	4	Certifying authority, NDT rep national wheel
6	Selection for level 2 trainees for level 2 qualification	1 day	5	NDT rep national wheel
7	Work experience for at least six months at level 1	150 days (6 months)	6	NDT rep national wheel
8	Organised training to level 2 comparable qualification	15 days (3 weeks)	7	outside agency
9	Certification to level 2	2 days	8	Certifying authority, NDT rep national wheel

APPENDIX A

No.	Heading / Sub-section	Comply		Comments
		Yes	No	
1.0	OVERVIEW			
1.1				
1.2				
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2.0	SCOPE OF WORK			
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6.0	DURATION			
6.1				
7.0	COSTING STRUCTURE			
7.1				
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8.0	PAYMENT AND RETENTION FEE			
8.1				
9.0	CERTIFICATION PLAN			
9.1				
Table 2				