



23

SAFETY COUNCIL

International World

OCTOBER 1 - 6, 2023

IRSC 2023

INTERNATIONAL RAILWAY SAFETY

“Recharging, Reimagining, Rebuilding”

CAPE TOWN, SOUTH AFRICA



Dr Ann Mills, Anisha Tailor, Paul Leach, Kirsten Huysamen & Priya Shah
Rail Safety and Standards Board

Identifying Non-Technical Skills behavioural markers in rail controller and maintenance roles



What are Non Technical Skills?

Competence

Non Technical Skills

Technical Skills

Underpinning knowledge



‘The personal, social and thinking skills that underpin technical skills and contribute to safe and efficient task performance’



Examples of technical skills and non-technical skills

Read notices

- Focus on specific information (e.g. locations)
- Identify unusual or unexpected information
- Make notes to help you remember

Carry out a routine maintenance exam

- Take an unhurried, step-by-step approach
- Monitor surroundings to ensure the worksite remains safe
- Communicate issues to team leader quickly



Why use Non-Technical Skills?

- Provides a common language for the behavioural element of competence
- Proficient to expert vs. competent/not competent
- Helps us better observe, measure and improve what people do and how they do it
- Promising results in GB rail (reported reductions in SPADs)





NTS benefits seen in other industries

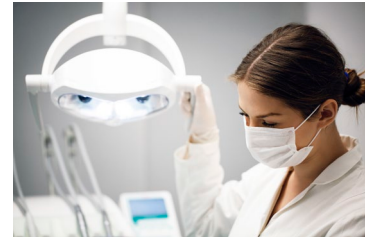
A European Aviation company survey

- ✓ Increased safety awareness
- ✓ Enhanced safety/just culture
- ✓ Increased awareness of incident trends
- ✓ Improved procedures
- ✓ Identified training needs



Studies on the impact of NTS in Healthcare

- ✓ Reduced perioperative mortality (around the time of surgery)
- ✓ Reduced readmissions rate
- ✓ Improved medical outcomes
- ✓ Higher quality and safety of care
- ✓ Improved safety culture





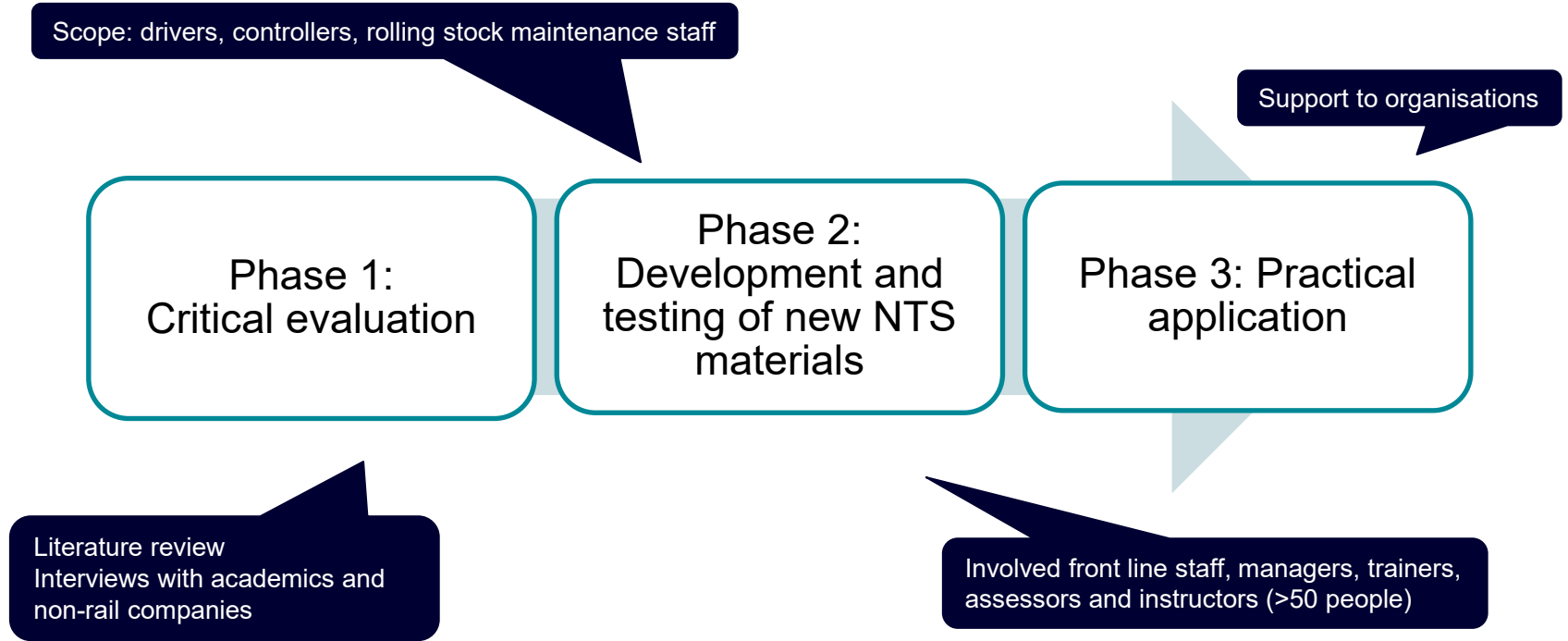
GB Rail NTS challenges

- Seen as a high priority but...
- Inconsistent integration across roles
- Inconsistent understanding about what the NTS mean and how to use them
- NTS information is either not detailed enough or too detailed

NTS categories	Skill
1. Situational awareness	1.1 Attention to detail 1.2 Overall awareness 1.3 Maintain concentration 1.4 Retain information 1.5 Anticipation of risk
2. Conscientiousness	2.1 Systematic and thorough approach 2.2 Checking 2.3 Positive attitude towards rules and procedures
3. Communication	3.1 Listening 3.2 Clarity 3.3 Assertiveness 3.4 Sharing information
4. Decision making and action	4.1 Effective decisions 4.2 Timely decisions 4.3 Diagnosing and solving problems
5. Co-operation and working with others	5.1 Considering others' needs 5.2 Supporting others 5.3 Treating others with respect 5.4 Dealing with conflict or aggressive behaviour
6. Workload management	6.1 Multi-tasking and selective attention 6.2 Prioritising 6.3 Calm under pressure
7. Self-management	7.1 Motivation 7.2 Confidence and initiative 7.3 Maintain and develop skills and knowledge 7.4 Prepared and organised



Approach – T1207 NTS Research





Key recommendations from Phase 1

- What changes should be made to the RSSB NTS framework?
 - Put the behavioural descriptions of NTS ‘front and centre’
 - NTS should be observable, trainable and measurable
 - Reduce confusion between NTS and personality traits
 - Keep the language simple and clear
 - Review whether teamworking and leadership are missing

Based on:

- Literature review of >1600 scientific papers on NTS
- Interviews with non-rail companies using NTS
- Interviews with academics and researchers working on NTS



Phase 2 Site visits: Method

Agreed activities to explore for each role

Rolling stock maintenance staff

Driver / shunter

Controller

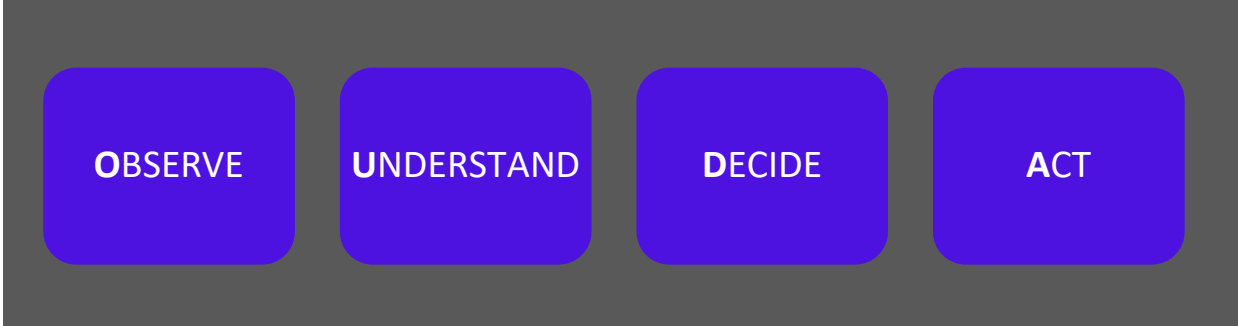
Observation of front line work activities



Interviews with relevant staff



Review of procedures and other relevant documents





Phase 2 Site visits: Job roles and companies

Rolling stock maintenance	Driver / shunter	Controller
Roles of staff involved		
<p>Fitters Engineers Technicians Team leaders Production managers Trainer/assessors Depot managers</p>	<p>Passenger drivers Freight drivers Shunter drivers TU reps Driver trainers Shunter DI Driver team manager Ops delivery managers</p>	<p>Controllers (train service, maintenance, incident, power, customer info) Duty control managers Customer service control manager Route control manager Control competence and development manager Heads of control</p>
Companies		
<p>GTR NTS Global Freightliner Alstom</p>	<p>GTR LNER NTS Global GBRf GWR</p>	<p>Network Rail GWR Freightliner TPE</p>



Overview of the new NTS materials

[Revised] RSSB NTS framework: Categories, skills, and descriptors (one pager)

Revised NTS framework (one page summary)

NTS category	Non-technical skill	Skill descriptor
1. Situational awareness Aware of what is going on and able to anticipate what could happen	1.1 Attention to detail	Can focus on details when needed, and identify unusual or unexpected things
	1.2 Overall awareness	Can step back from the detail to monitor and understand the overall situation
	1.3 Maintain concentration	Uses techniques to stay alert and manage distraction
	1.4 Retain Information (during shift)	Uses techniques to remember and recall information
	1.5 Anticipation of risk	Is alert to hazards, risks and errors traps, and responds
2. Diligence Careful, thorough, consistent and logical when completing a task	2.1 Systematic and thorough approach	Completes tasks using a logical and thorough approach
	2.2 Checking	Checks actions and information rather than making assumptions
	2.3 Follows rules and procedures	Complies with rules and procedures
3. Communication Communicating effectively through spoken, written, and non-verbal means	3.1 Listening (people not stimuli)	Listens, understands, and responds appropriately
	3.2 Clarity	Communicates clearly and concisely
	3.3 Assertiveness	Speaks up and challenges when needed
	3.4 Sharing information	Shares information at the right time to the right people
4. Decision making and action Making decisions and then taking action within area of authority	4.1 Effective decisions	Weighs up information and options to make a decision
	4.2 Timely decisions	Makes decisions and takes action at the right time
	4.3 Diagnosing problems	Establishes the cause of problems
5. Cooperation and working with others Working with others in a positive, respectful and supportive manner	5.1 Considering others' needs	Considers the views and needs of others
	5.2 Supporting others	Cooperative, supports others and takes the lead when required
	5.3 Treating others with respect	Is respectful and polite
	5.4 Dealing with conflict/aggressive behaviour	Recognises and helps address challenging behaviour and conflict
6. Workload management Managing and prioritising workload	6.1 Selective attention	Can switch between different information and tasks when needed
	6.2 Prioritising	Can prioritise information and tasks
	6.3 Calm under pressure	Uses techniques to remain calm under pressure
7. Self-management Motivated, confident and prepared to do the job as well as possible	7.1 Motivation	Performs beyond the minimum requirements of the role
	7.2 Confidence and initiative	Can work independently but asks for help when needed
	7.3 Maintain and develop skills and knowledge	Keeps knowledge and skills up to date
	7.4 Prepared and organised	Is prepared and organised for work

- Retaining the focus of NTS on competence
- Generic across all rail safety-critical roles
- Descriptors added for the categories and skills
- Provides the basics of NTS (e.g. for an introduction)



Overview of the new NTS materials

[Revised] RSSB NTS framework: Categories, skills, and descriptors (one pager)

NTS task examples

Task examples of what each NTS looks like

NTS behavioural descriptions with task examples

Descriptions of positive NTS behaviours

NTS strategies

Practical strategies for applying NTS

Role-specific: Drivers/shunters | Controllers | Rolling stock maintenance staff



NTS task examples

2.2 Checking

Checks actions and information rather than making assumptions

Equipment, machinery, vehicles, and protection: checks that protection is in place (e.g. prescribed protection, handbrake) before working on vehicle; carries out pre-use inspection of machinery before use; checks vehicle before sending back to service; checks calibration of tools before use.

Depot moves and worksite: when completing a train move, checks people are off the road before train movement; checks nothing else is on the road; checks the train is in right position; checks worksite is safe before starting work.

Labels, parts, components, and specifications: checks part number is correct when collecting consumables and parts; checks replaced/retired/exchanged parts before placing them in the correct container; checks replacement components and parts before fitting on vehicle; checks specification before exam to be certain on limits, measurements, units of measurements used, and that nothing has changed since the last inspection.

For: managers, trainers and assessors, to help discuss, observe and develop NTS performance



NTS behavioural descriptions with task examples

Behavioural markers	Task examples
Checks equipment, vehicles, machinery, and protection and does not assume it is safe.	Checks that protection is in place (e.g. prescribed protection, handbrake) before working on vehicle; carries out pre-use inspection of machinery before use; checks vehicle before sending back to service; checks calibration of tools before use.
Checks labels, parts, and components.	Checks part number is correct when collecting consumables and parts; checks replaced, retired, and exchanged parts before placing them in the correct container; checks replacement components and parts before fitting on vehicle.
Checks safety of the worksite before commencing work and does not assume the site has been set up safely and/or people are in a place of safety.	When completing a train move, checks people are off the road before train movement; checks nothing else is on the road; checks the train is in the right position.
Checks information provided to them.	Checks specification before an exam to be sure on limits, measurements, units of measurements used and that nothing has changed since the last inspection.

For: those integrating NTS into CMSs, or anyone who wants to develop more NTS knowledge



Front Line NTS strategies

Starting tasks

What is the strategy?	Why do engineers, technicians, and fitters find these effective?	Are there any risks, limitations, or constraints
Strategy 1: Make notes when receiving a handover and ask questions if anything is unclear.	<p>These strategies help you to begin work tasks with the right information, tools and equipment you need and to think through how you will carry out the work safely and effectively. Writing things down when receiving a handover can reduce the risk of missing information provided to you and can help you remember this information during the shift.</p> <p>These strategies help you to use these NTS:</p> <ul style="list-style-type: none"> 1.1 Attention to detail 1.4 Retain information (during shift) 2.1 Systematic and thorough approach 2.2 Checking 3.1 Listening (people not stimuli) 7.4 Prepared and organised 	<p>Take care when noting or marking information, as any errors (e.g. writing down the wrong roads) could cause you to use the wrong information on shift.</p> <p>The use of these strategies may differ depending on whether you receive written information at handover.</p>
Strategy 2: "Take 2", take 2 minutes to think the job through before starting. For example: <ul style="list-style-type: none"> • Do I have the right tools, specifications, and paperwork? • Is there a risk assessment covering this activity? • Is there anyone my actions will have an impact on? 		
Strategy 3: Change PPE as required before starting a task (e.g. swap from bump cap to helmet when using crane; flameproof overalls, eye protection and leather gauntlets when using a cutting torch).		
Strategy 4: Carry out pre-use inspection on machinery before use (e.g. check the crane stops when it should, inspect stitching on the straps and slings for undone stitches).		
Strategy 5: Always check the specification before starting the job rather than relying on memory, as specifications get updated and things can change (e.g. tolerances).		

For:

- Staff, to help them choose practical things they can do to apply NTS
- Managers, to support competence development and post-incident plans



Overview of the new NTS materials

[Revised] RSSB NTS framework: Categories, skills, and descriptors (one pager)

NTS task examples

Task examples of what each NTS looks like

NTS behavioural descriptions with task examples

Descriptions of positive NTS behaviours

NTS strategies

Practical strategies for applying NTS

Role-specific: Drivers/shunters | Controllers | Rolling stock maintenance staff

NTS dos and don'ts and summary of RSSB NTS materials

Guidance on effective NTS integration

Rail industry examples of how to use NTS

Examples of how the NTS materials are being used



Developing a controller kit for adverse behaviour

- Control Seasons Pack

Development of a toolkit for control staff to use when preparing for and dealing with adverse weather events

Any trains that do run through floodwater, fleet should be advised and it should be logged, along with set numbers involved

Keep the log up to date and advise fleet when trains run through floodwater (sharing information).

Provide clear and concise information in the log, including the set numbers (clarity).

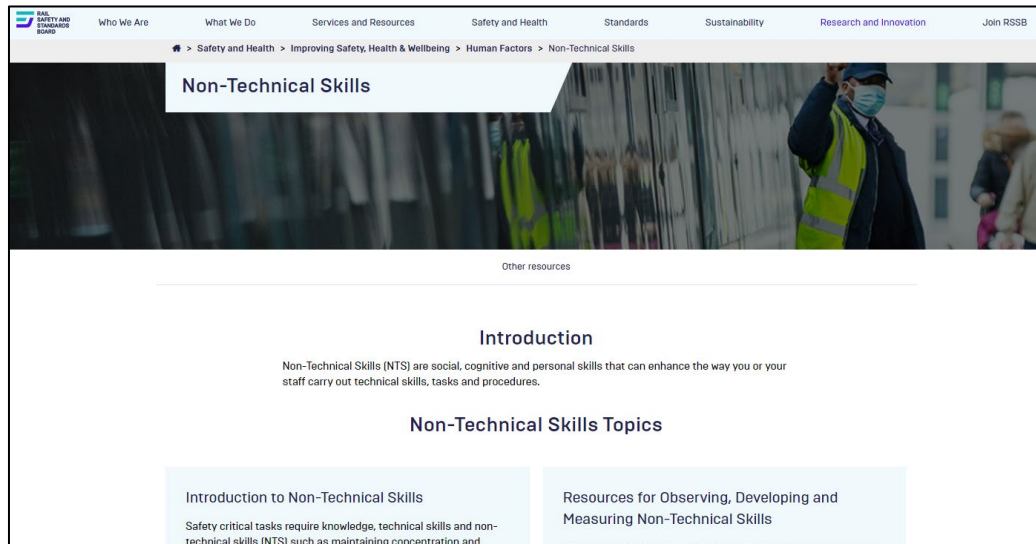
Read set numbers carefully (attention to detail) and check you have entered them correctly when logging information (checking).

Weigh up the available information on water levels with the instructions above to determine what should happen (effective decisions).

Where to find the new materials

www.rssb.co.uk/research-catalogue/CatalogueItem/T1207

<https://www.rssb.co.uk/safety-and-health/improving-safety-health-and-wellbeing/understanding-human-factors/non-technical-skills>



The screenshot shows the RSSB website page for Non-Technical Skills. The page has a navigation bar at the top with links for Who We Are, What We Do, Services and Resources, Safety and Health, Standards, Sustainability, Research and Innovation, and Join RSSB. Below the navigation bar is a breadcrumb trail: Home > Safety and Health > Improving Safety, Health & Wellbeing > Human Factors > Non-Technical Skills. The main content area features a large image of a construction worker in a high-visibility vest and a face mask. Below the image is a section titled "Non-Technical Skills" with a sub-heading "Other resources". The main heading is "Introduction", followed by a paragraph: "Non-Technical Skills (NTS) are social, cognitive and personal skills that can enhance the way you or your staff carry out technical skills, tasks and procedures." Below this is a section titled "Non-Technical Skills Topics" with two sub-sections: "Introduction to Non-Technical Skills" and "Resources for Observing, Developing and Measuring Non-Technical Skills".

Non-Technical Skills

Other resources

Introduction

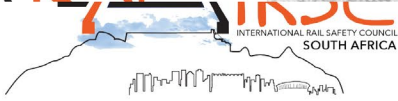
Non-Technical Skills (NTS) are social, cognitive and personal skills that can enhance the way you or your staff carry out technical skills, tasks and procedures.

Non-Technical Skills Topics

- Introduction to Non-Technical Skills
- Resources for Observing, Developing and Measuring Non-Technical Skills



IRSC



HOSTED BY



RAIL SAFETY ON THE RIGHT TRACK

www.irsc2023.com

