INDEPENDENT TRANSPORT SAFETY REGULATOR

Evaluating NTS Programs – Is there a better way?

Adrian Rowland, Louise Raggett

PACDEFF August, 2013

national rail safety regulator

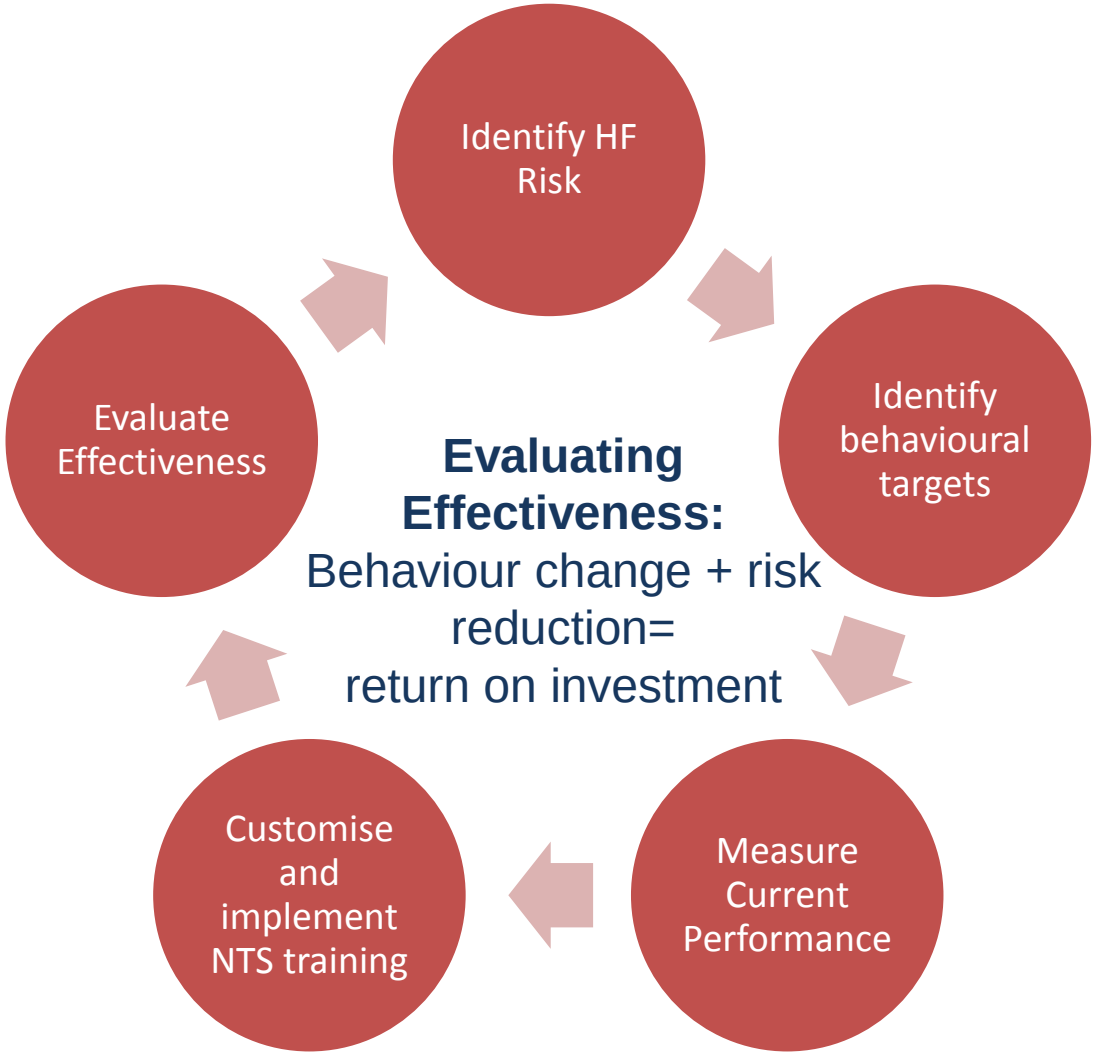
ITSR

Safe transport for NSW

Overview

- The need for good evaluation techniques
- Common evaluation methods
- Other approaches:
  - Behavioural monitoring
  - Behavioural self assessment surveys
  - Normal operations monitoring
  - Program maturity
- Recent hybrid example from ITSR
- Conclusion

Improving evaluation methods – why?



Common evaluation methods

- Compliance Audits,
- Line Checks,
- Classroom assessment
- Course evaluations
- CBT
- NOTECHS
- LOFT
- LOSA
- Other alternatives...?

LOSA COLLABORATIVE

Q3) Was the instructor knowledgeable?
Q4) How did you find the lectures and the presentations?
Q5) Did you find the course materials and readings helpful?
Q6) Did the course meet your expectations?

Behavioural Safety Monitoring

How it works:

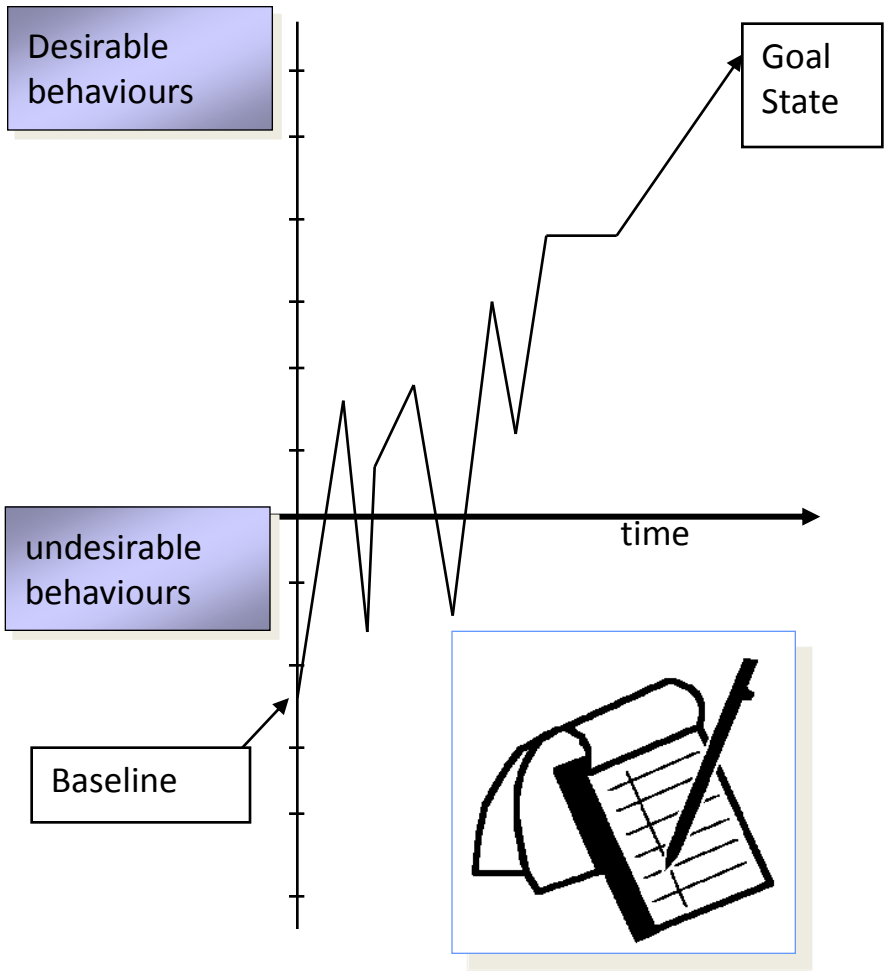
- Define risks & behaviours to change
- Develop checklist of behaviours
- Peer to peer observations
- Pre and post intervention

Advantages:

- targets specific behaviours
- Participation influences behaviour
- Lots of data

Disadvantages:

- Not independent measure
- Valid behaviour markers?
- Is change sustainable over time?



Agnew&Snyder, 2002; Geller, 2001; Krause, 1997; McSween, 2003

Behavioural Monitoring – Case Study

Ramp operations UK airport / Marsh Consulting:

Defined target areas, trained observers, training intervention, conducted observations, publish and review results.

Claimed benefits:

- Desired level of human performance achieved (behaviour change)
- 9% increase in safety performance (risk reduction)
- convinced insurer to decrease premium (value)
- Named ground handler of the year

Behaviour Based safety

MARSH

ITSR

Safe transport for NSW

Self Assessment Surveys

How it works:

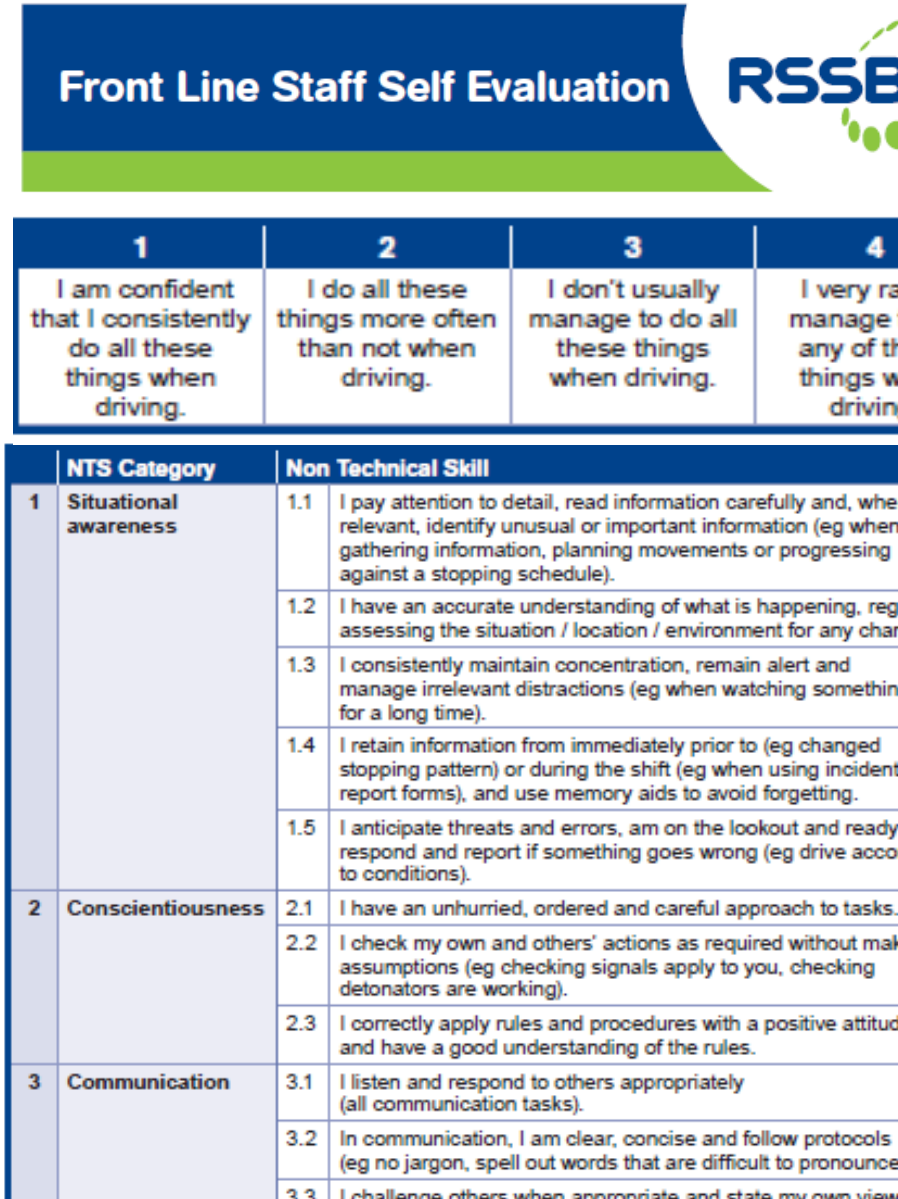
- Survey asks how well/ often you/others display this behaviour
- Pre and post intervention

Advantages:

- Can be generic or targeted behaviours
- Lots of data/baseline+ trends
- reaches broad population
- cheap and quick
- Informs TNA

Disadvantages:

- perceptions only
- In built bias



Front Line Staff Self Evaluation

RSSB

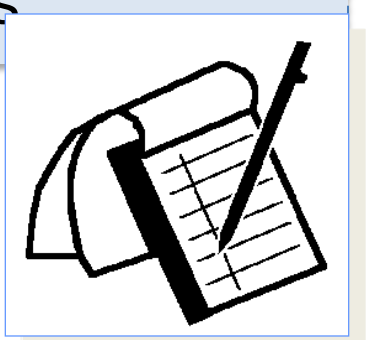
1	2	3	4
I am confident that I consistently do all these things when driving.	I do all these things more often than not when driving.	I don't usually manage to do all these things when driving.	I very ra manage any of th things w drivin

	NTS Category	Non Technical Skill	
1	Situational awareness	1.1	I pay attention to detail, read information carefully and, whe relevant, identify unusual or important information (eg when gathering information, planning movements or progressing against a stopping schedule).
		1.2	I have an accurate understanding of what is happening, reg assessing the situation / location / environment for any char
		1.3	I consistently maintain concentration, remain alert and manage irrelevant distractions (eg when watching somethin for a long time).
		1.4	I retain information from immediately prior to (eg changed stopping pattern) or during the shift (eg when using incident report forms), and use memory aids to avoid forgetting.
		1.5	I anticipate threats and errors, am on the lookout and ready respond and report if something goes wrong (eg drive acco to conditions).
2	Conscientiousness	2.1	I have an unhurried, ordered and careful approach to tasks.
		2.2	I check my own and others' actions as required without mak assumptions (eg checking signals apply to you, checking detonators are working).
		2.3	I correctly apply rules and procedures with a positive attitud and have a good understanding of the rules.
3	Communication	3.1	I listen and respond to others appropriately (all communication tasks).
		3.2	In communication, I am clear, concise and follow protocols (eg no jargon, spell out words that are difficult to pronounce
		3.3	I challenge others when appropriate and state my own view

Self Assessment Surveys- Case Study

Harris et al (2005) questionnaire -flight on errors made on approach/landing:

- if ever made the error themselves or if other pilots made the same error.
- Results = normative and in-depth view of human performance, from the operators themselves



Sutton (2012) "hanger talk" pilot survey concluded: "*surveys illicit similar naturalistic information to observation based TEM approaches used by airlines today*"

Normal Operations Monitoring

How it works:

- Independent observers
- Observe behaviours which increase /decrease risk
- BM's emerge from observations
- Train adaptive behaviours
- Continue observations post training

Advantages:

- Evidence based BM's, measures behaviour, customised, in house, continuous data
- Targeted, risk focused

Disadvantages:

- resources intensive ,especially at start up
- Not suitable for highly cognitive tasks (eg ATC)

Normal Operations Monitoring- Case Study

Key differences from LOSA
Neutral taxonomy, simplified TEM
In house continuous data
Only observable behaviours (not cognitive processes)
Equal focus on successful (resilient) and unsuccessful behaviours
Task based codes based on current rules (deviation from standard, not error)
Successful/unsuccessful behaviours judged on outcomes
behaviour markers derived from observations evidence
TEM relationships emerge from statistical analysis

Williamson, A Raggett L 2013

Evaluating Program Maturity

How it works:

- Self assessment based categorisation of a level of maturity
- Composite measure of many characteristics

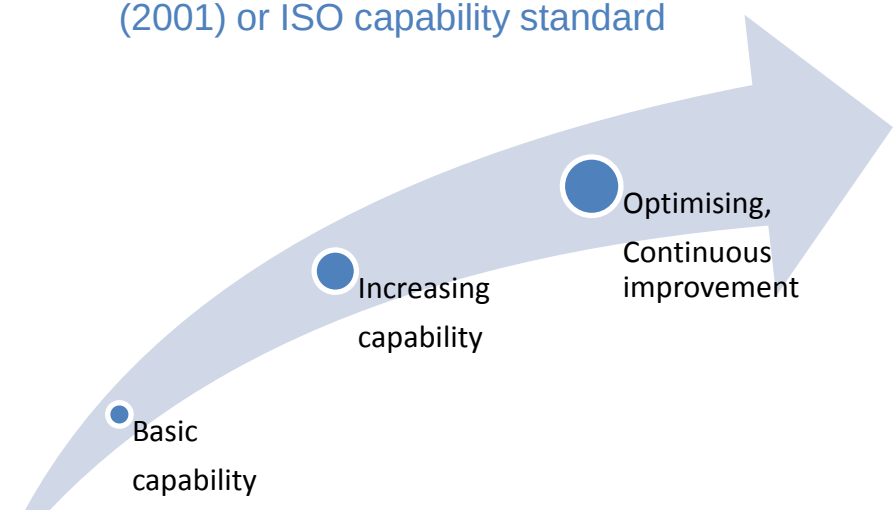
Advantages:

- Holistic measure of program
- Promotes continuous improvement
- Shows how to progress to next level

Disadvantages:

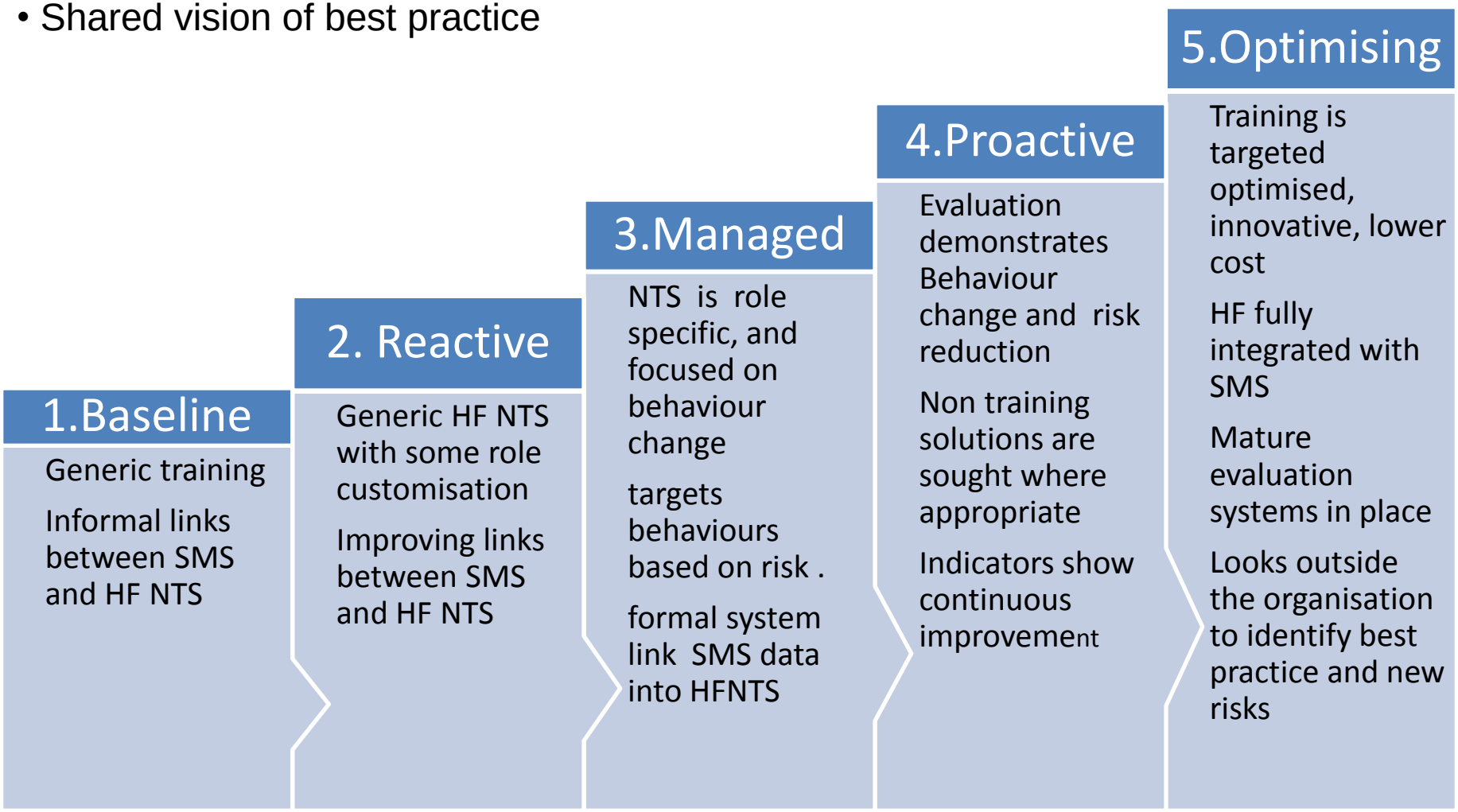
- Un-validated models
- Based on consensus best practice

Evolution/Maturity models:
Eg see Fleming (2001) and Hudson (2001) or ISO capability standard



Evaluating Program Maturity-Case Study

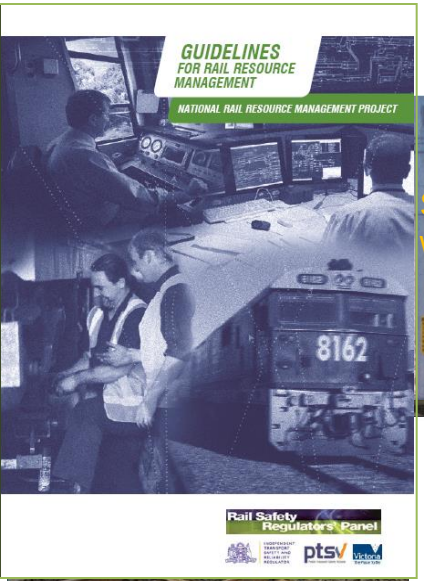
- based on NTS practitioner interviews
- Shared vision of best practice



O'Flanagan and Raggett, AAVPA 2012

RRM for Safety Critical Communications (SCC)

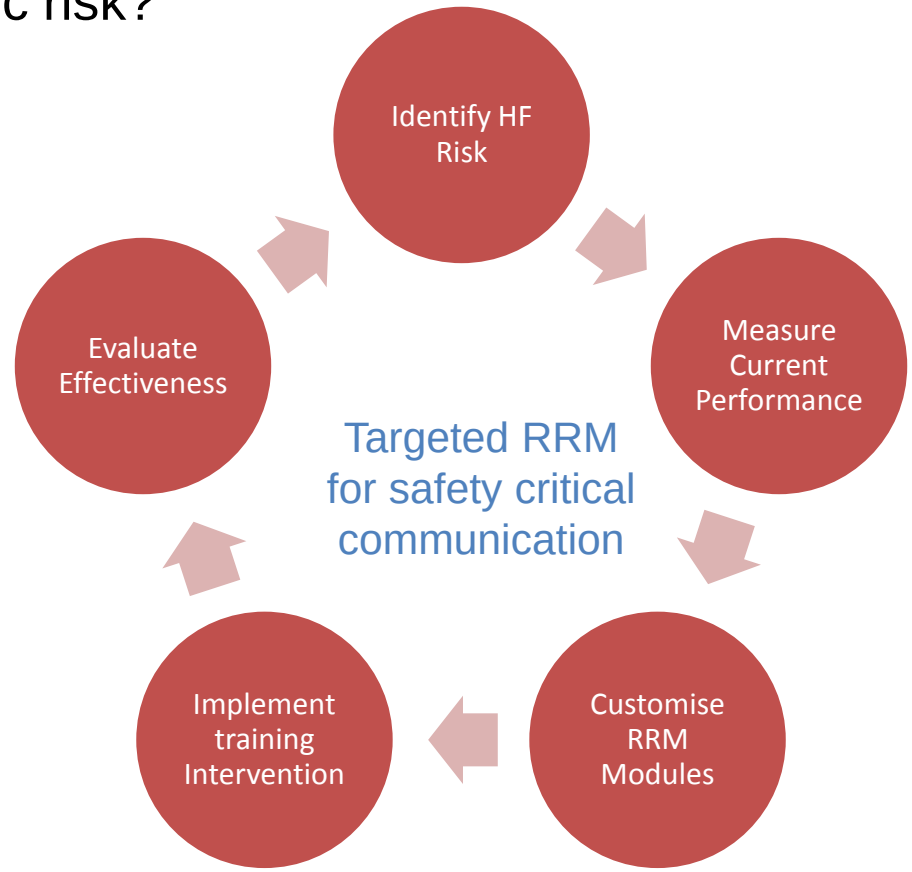
- safety critical communication incidents
- Poor uptake of existing RRM package
- demonstrate effectiveness with specific risk?



Strathfield Near-miss track workers

Newbridge Collision

Kogarah Track Worker Fatality



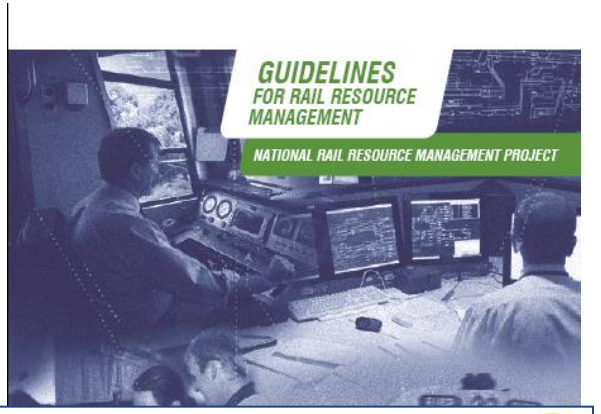
ITSR
Safe transport for NSW

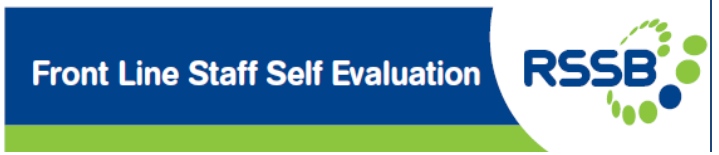
RRM for SCC project

Develop tools for measuring communication behaviors

Approach draws on a number of existing sources :

- RSSB observations of adaptive, maladaptive behaviours for Safety critical communications (SCC)
- Checklist /Behavioural monitoring methods
- Observational (LOSA) style programs
- Behavioural self assesment surveys





1	2	3	4
I am confident that I consistently do all these things when driving.	I do all these things more often than not when driving.	I don't usually manage to do all these things when driving.	I very rarely manage to do any of these things when driving.

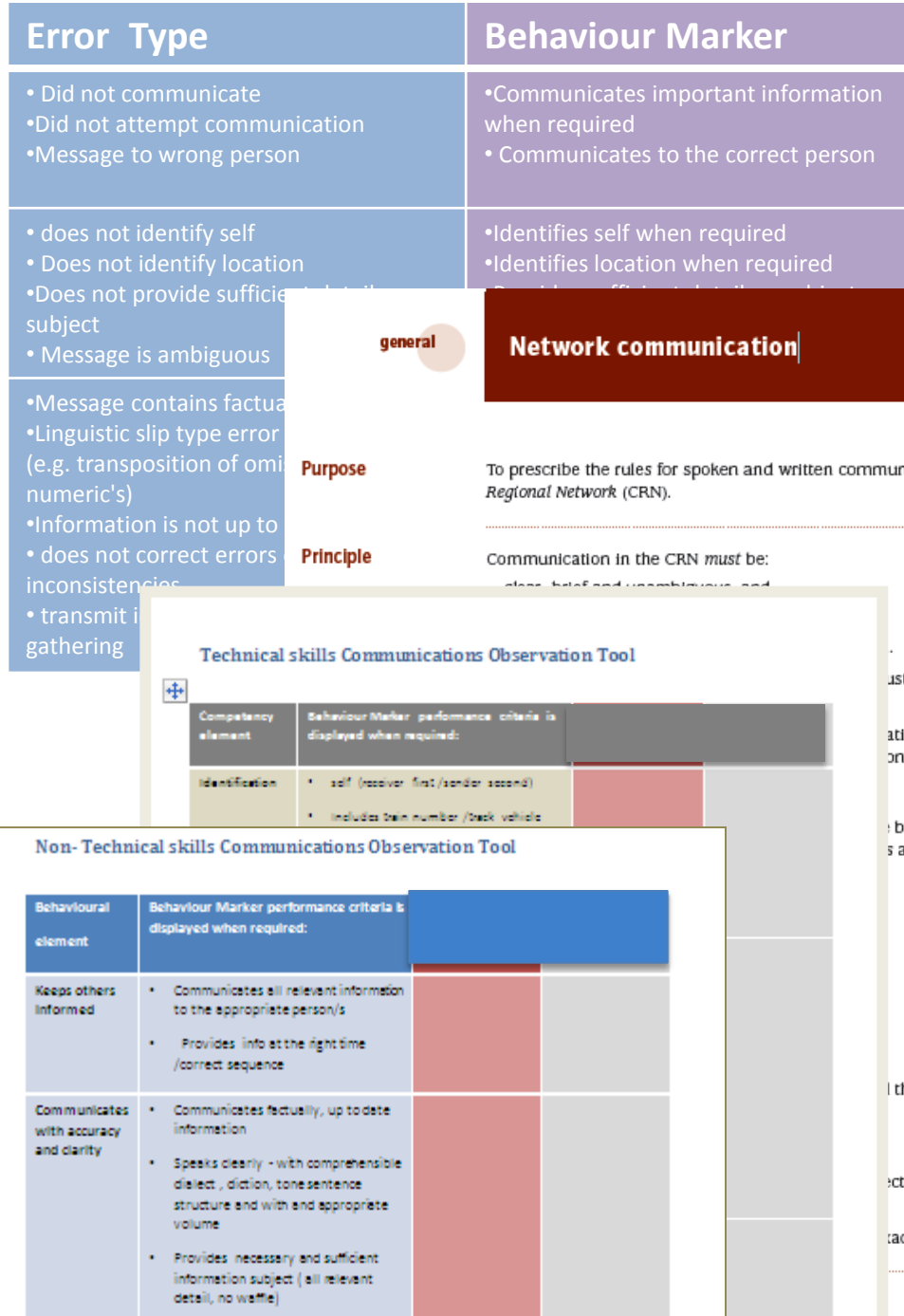
LOSA - Line Operations Safety Audit

Behaviour Based safety

ITSR
Safe transport for NSW

RRM for SCC project

- A technical skills (TS) checklist from network rules
- A non technical skills (NTS) checklist from work on communication error:
  - RSSB, 466 observations of signaller/driver comms plus questionnaire and structured interview
  - SCC behaviours markers were already in RRM

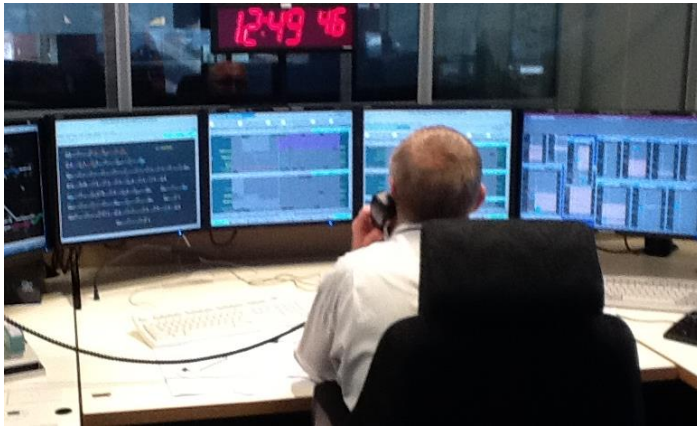


Error Type	Behaviour Marker
• Did not communicate •Did not attempt communication •Message to wrong person	•Communicates important information when required • Communicates to the correct person
• does not identify self • Does not identify location •Does not provide sufficie subject • Message is ambiguous	•Identifies self when required •Identifies location when required
•Message contains factua •Linguistic slip type error (e.g. transposition of omi numeric's) •Information is not up to • does not correct errors inconsistencies • transmit i gathering	

RRM for SCC project

Test tools and approach

- Sample of Network Controllers conversations
- 200 recordings sampled
- 68 complete exchanges assessed for NTS technical (RRM) skills
- (Technical skills not assessed)

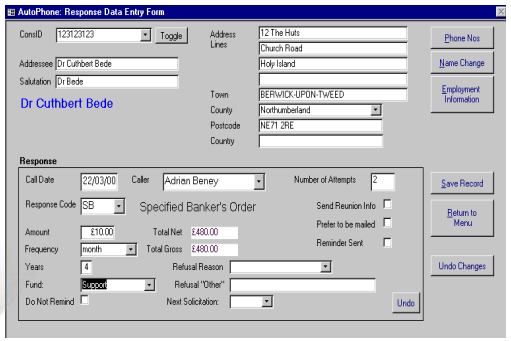


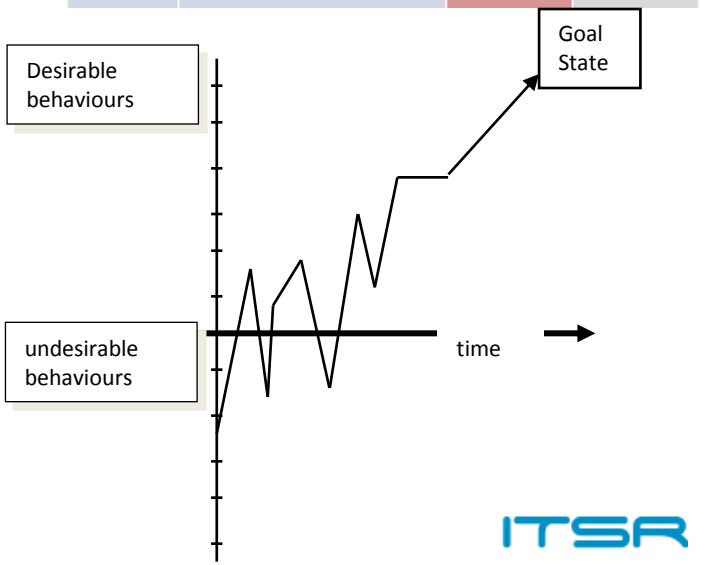
RRM for SCC project

- Scoring:
  - “ticks” = desired behaviour demonstrated
  - “crosses” = behaviour should have been demonstrated, but was not
  - Combined score of +ve and –ve responses

Non- Technical skills Communications Observation Tool

Behavioural element	Behaviour Marker performance criteria is displayed when required:	[redacted]	Other Safety Critical Staff
Keeps others informed	• Communicates all relevent information to the appropriate person/s • Provides info at the right time /correct sequence		
Communicates with accuracy and clarity	• Communicates factually, up to date information • Speaks clearly - with comprehensible dialect , diction, tone sentence structure and with and appropriate volume • Provides necessary and sufficient information subject (all relevant detail, no waffle) • Provides unambiguous instructions information and explanation		
Demonstrates Appropriate Assertiveness	• Takes lead responsibility for communication • Communicates confidently and with appropriate authority • Corrects errors or inconsistencies when necessary • Concerns about safety are expressed strongly and persistently		





ITSR
Safe transport for NSW

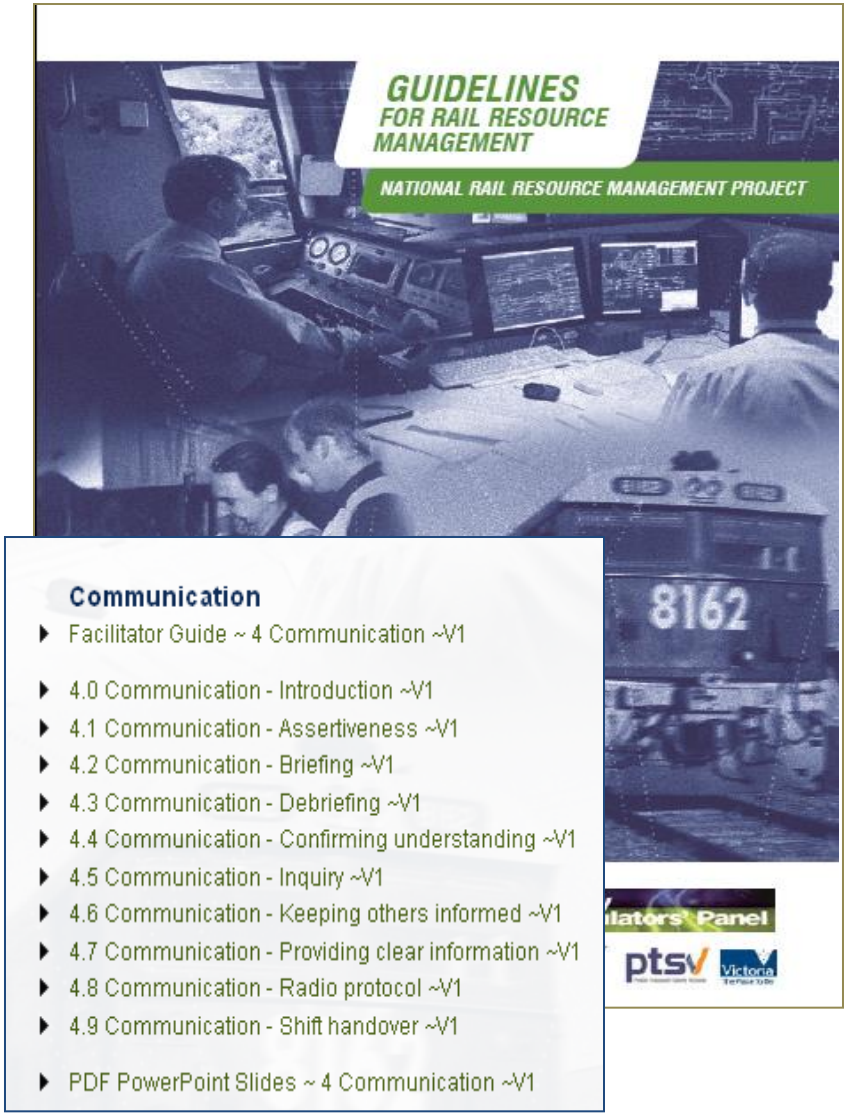
RRM for SCC project

Training Intervention:

- BMs become the learning outcomes of targeted behaviour based training

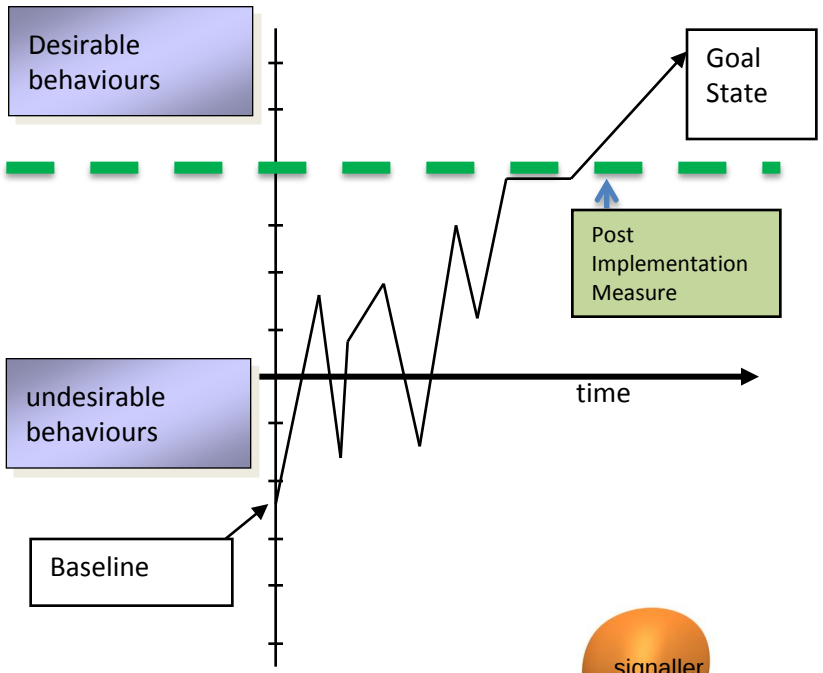
Plus relevant, generic topics :

- Risk Perception
- Managing distraction
- Maintaining SA



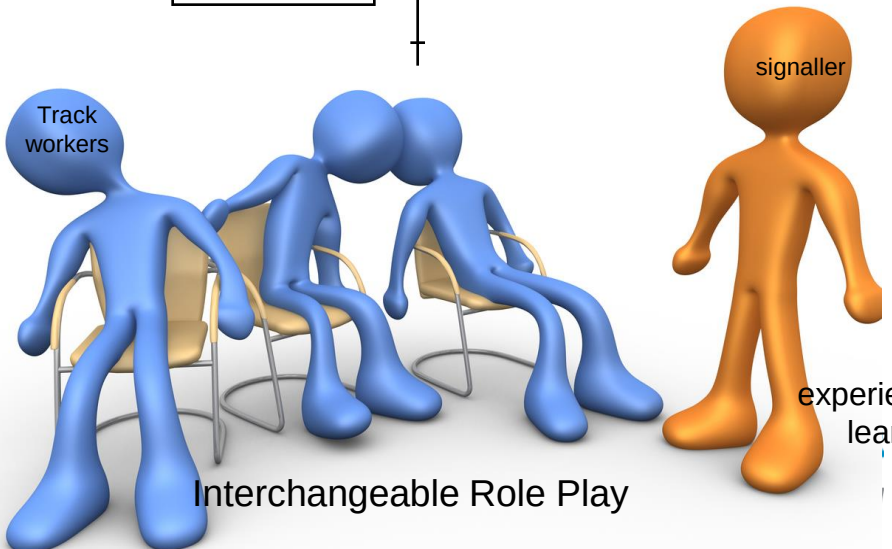
RRM for SCC project- Next steps

- Increase industry partners and conduct trial
- Pre and Post self assessment
- Repeat behavioural measurement



Rate your ability to display each skill by marking a line on the 5 point scale

Behavioural element	Behaviour Marker performance criteria	Rating (1-5)
Keeps others informed	1. I communicate all relevant information to the right people	
	2. I provide the right info at the right time in the correct order	
Communicates with accuracy and clarity	3. I plan what I am going to say before I say it	
	4. I communicate factual up to date information	
	5. My speaking voice is clear and comprehensible to others	
	6. I avoiding unnecessary detail and waffle	
	7. My communications are clear and unambiguous with little need for further clarification	



Interchangeable Role Play

Kolb experiential learning

Summary

- Start with the human risks to be managed (link to SMS)
- Decide which risks are best managed by training NTS
- Target behaviours based on evidence.
- Concentrate training on specific behaviours
- Assess behaviour change and risk reduction

Example:

Case Study:

Queensland Rail

How tailored NTS training has shown positive effects on error management in the Rail Industry

Samantha Carter – Senior Human Factors Consultant
1 August 2012

*"trainee drivers more than twice as likely to SPAD in their first 12 months if they had **not** had RRM training (compared to if they had) - 26.3% compared to 13.71%."*

Conclusion

Evaluating Effectiveness:

Behaviour change + risk reduction= return on investment

Questions?