



NCMMA EWS Reg 8.10 CPS Compliance Journey

SACEA AGM

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On behalf of Bontle Mtshengu



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Objective



Objective

- Share the NCEWS approach on Reg 8.10
- Promote alignment with the MOSH Blueprint
- Solicit support to collaborate with the NCEWS



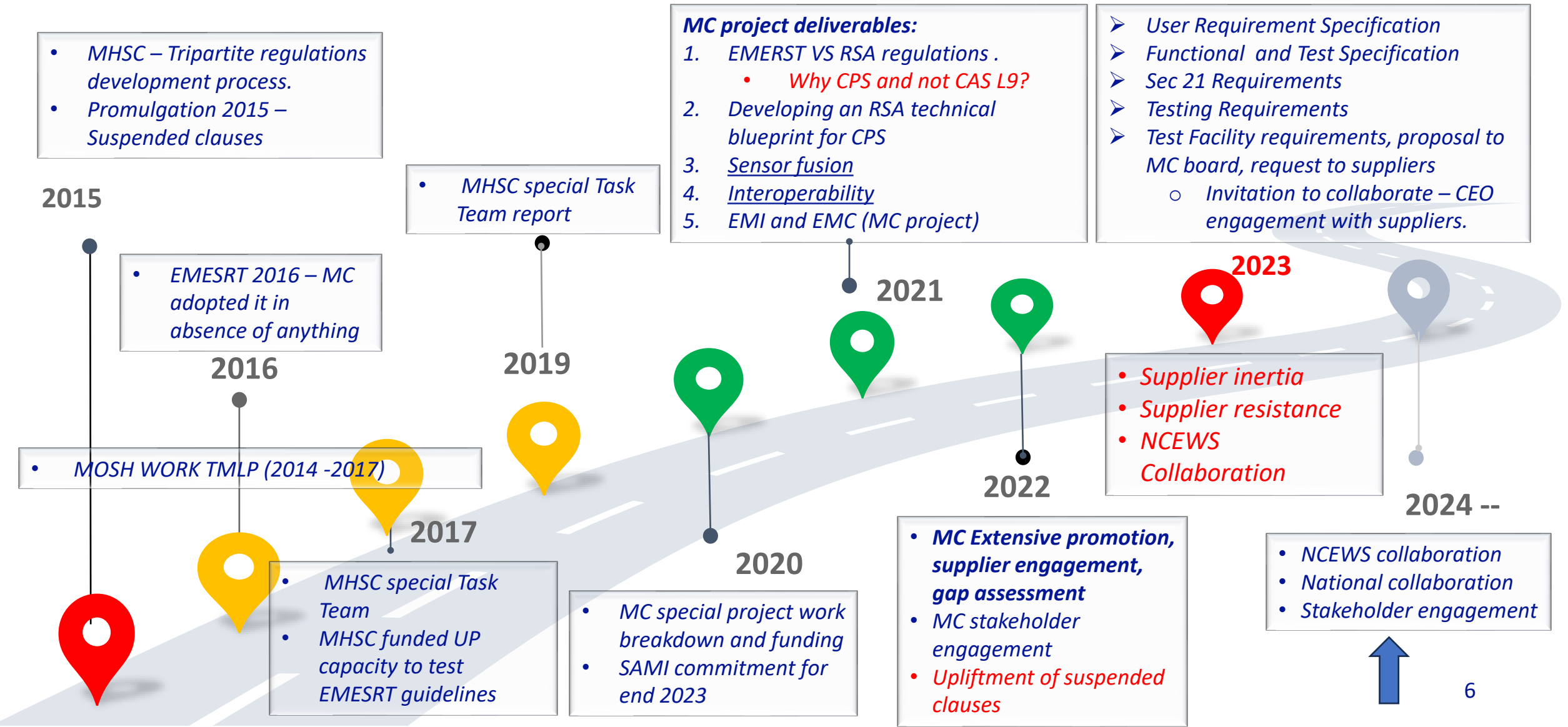
REFLECTION AND CURRENT REALITY





NCEWS CPS – Reflection and Current Reality

RSA CPS Journey 2013 - 2024





NCEWS CPS – Reflection and Current Reality

RSA CPS Journey 2013 - 2023

Minerals Council Engagement 5 May 2023 revealed:

**Minerals Council
shared the
outcome of the
project work on
EMERST vs REG
8.10**

- A Collision Prevention System (Reg 8.10) has very specific requirements. Reg 8.10:
 - Does not mention or differentiate between L7, L8 or L9
 - Does not provide for “operator override functions”
 - Requires a TMM to auto slow and autostop when the CPS fails at any condition



NCEWS CPS – Reflection and Current Reality

EMERST vs CPS

RSA Regulations	EMESRT
CPS	CAS L9
Specific Functional requirements for each of the CPS products (CXD and TMM CPS with acceptance criteria	Generalised Requirements with no acceptance criteria (Supplier defined)
Fail to Safe without Human Intervention	No Fail to Safe requirement
Self Diagnostics to enable FTSWHI	No specific FTS requirements
Specific Log Keeping requirements for Legal Liability protection	No specific requirements
Effective Warning required	No specific requirement
Only emergency override allowed.	No restriction on the use of override buttons
Interface communication standard: ISO 21815-2 2021	No Specific Requirements. Supplier defined
Proof of Conformance required. Credible international based independent Testing Regime	No Proof of Conformance required. Supplier defined
Specific Test Specifications and Testing Protocols using specific test instrumentation	No Specific Requirement. Supplier defined

EMESRT L9 CAS is NOT A CPS

TODAY there is still no compliant “L9” system in the SAMI





NCEWS CPS – Reflection and Current Reality

RSA CPS Journey 2013 - 2023

Minerals Council Engagement 5 May 2023:

- Most mines within the region were **NOT** sufficiently involved, lacking comprehensive information regarding the intricacies of the project.
- **Throughout this period, until May 5, 2023, we followed the EMESRT-based approach without making adjustments to align with the ongoing initiatives of the Minerals Council.**
- Notably, one or two mines in the region proactively engaged in the Minerals Council's work at an earlier stage, actively participating and exchanging valuable insights and learnings.

Acknowledging the current lack of expertise in mines for this challenging technology, we recognize the importance of adopting the **Minerals Council's** initiatives and working together to achieve success as soon as possible.

What will enable **COMPLIANCE?**

**A CPS that conforms to the
MOSH CPS blueprint will
enable a mine to be compliant**



NCEWS CPS JOURNEY





NCEWS CPS Journey

Collaboration

Align on the way forward

Collaborate as a Region and Adopt MOSH blueprint

Share with DMRE

Collaborative Engagements with Suppliers





NCEWS CPS – Collaboration Approach – Focus Areas



NCEWS Reg 8.10 focus areas

- **Definition** (Fail to Safe, Significant Risk, Injury, CPS, Level 9 etc, **what is compliance?**)
- **Risk Approach** - Significant Risk of Collisions. Risk “Assessment” Approaches: Traffic Flow and Risk Analysis, Vehicle Interaction Risk Evaluation (Mitacom)
- Compliance Strategies in the Region – Traffic Flow Risk Analysis, Traffic Management and CPS
- **Technical Requirements – what constitutes a compliant machine? ISO interface**
- **Testing - What, How and Why? Testing Regime**
- Engagements NCMMA, DMRE, Tripartite, other stakeholders
- **Supplier Engagement – (Sec 21, Skills, local manufacture, service support)**
- Progress management: Current Status and Progress Demonstration
- **Legacy Equipment/Unintelligent TMMs**
- **Change Management**



NCEWS CPS – NCEWS Journey

Approach DMRE Engagement

- Share the initiative with DMRE (14 December 2023)
 - DMRE raised several questions and challenges
 - DMRE Bi- monthly progress update
 - Northern Cape Mines progress
 - Updates on compliance and testing
 - Other actions (Skills, local manufacture etc)
 - Individual mines must align and present to the DMRE



NCEWS CPS – NCEWS Journey

Approach - Stakeholder Alignment

Expectations;

Suppliers		
• Acknowledge that NC mines adopted MOSH as their compliance standard • Accept accountability for products and systems as per sec 21 of MHSA • TRL 4 Tests a matter of urgency • Provide commitment dates to close the GAPS • Collaborate with NCEWS for TRL testing • Skills development and capacity building • Local manufacturing • Establish / expand testing capacity	<th>Mines</th>	Mines
	• Individual mines must align and present to the DMRE • 2.13.1s must take up their legal accountability wrt Reg 8.10 in a visible way. • Understand the regulations and the legal implication • Conduct TFRA prior to technology implementation • Request TRL reports when tendering • Request TRL test certificates and submit to DMRE • Change Management Process	

Stakeholder Alignment Responsibilities

Legal Context

- 1) The MHSA and its regulations are crafted collaboratively by Tripartite stakeholders, not solely by the DMRE.
- 2) The Tripartite mandate does not include developing detailed specifications.
- 3) The DMRE does not have the authority to enforce the MOSH CPS Blueprint.
- 4) Regulatory oversight of mines falls under the purview of the DMRE.
- 5) NCDMRE endorsed the MOSH blueprint
- 6) **MOSH CPS Blueprint is a legal requirement to satisfy the requirements of Reg 8.10.1 & 2 for mines that adopted it.**

Supplier's responsibility

- 1) Suppliers must demonstrate adherence to mine directives as per Section 21.
- 2) The Minerals Council created a CPS Blueprint that suppliers must follow to assist 2.13.1 in fulfilling legal obligations.
- 3) For mines adopting the MOSH CPS Blueprint, compliance is mandatory for suppliers to satisfy Section 21.
- 4) Several NC mines have adopted the MOSH CPS Blueprint, making compliance obligatory for CPS suppliers.
- 5) Non-compliance by a CPS supplier in independently verifying its product(s) is unlawful.

2.13.1 Engineer duties

- 1) Mines must comply with regulations and ensure suppliers do the same, facing fines or imprisonment for non-compliance.
- 2) The 2.13.1 Engineer holds primary responsibility for compliance with Regulations 8.10.1 and 8.10.2.
- 3) It's the 2.13.1's duty to interpret and implement these regulations.
- 4) Every mine must establish CPS Functional Specifications and Requirements for compliance
- 5) What the mines procures regarding Regulations 8.10.1 and 8.10.2 is governed by Section 21 of the MHSA.
- 6) Mines must ensure supplier compliance with their directives.
- 7) The 2.13.1 Engineer enforces compliance with the MOSH blueprint by requiring independent verification for CPS suppliers to meet the standards of Section 21.

Mineral's Council duties

- 1) The MINERALS COUNCIL is a mining industry employers' organization that SUPPORTS + PROMOTES its members in the South African mining industry.
- 2) The Minerals Council developed a CPS Blueprint to aid the 2.13.1 in meeting legal obligations.

Testing and Verification

- 1) The University of Pretoria is currently the sole independent CPS testing organization qualified for MOSH CPS blueprint verification.
- 2) Other independent CPS verification entities can be utilized by mines or CPS suppliers upon demonstrating comparable testing capabilities.

PROGRESS REPORTING





NCEWS CPS – NCEWS Journey

Progress - Where we are...

Achievements to date,

- Alignment wrt definitions, requirements, reporting etc between NC mines (+/- 43 mines)
- Established a CPS Supplier forum and aligned on expectations and responsibilities (22 suppliers / Testing, CPS blueprint)
- CPS supplier engagements +- 160 attendants per engagement
- Presented to MRAC and MOSAC
- Quarterly DMRE report
- Individual supplier engagements – Komatsu adoption of the MOSH blueprint
- CPS supplier exhibition

Challenges,

- Regional misalignment (Mines, Suppliers, DMRE)
- International suppliers remain a challenge in adopting and embracing the MOSH blueprint – BWE/CAT resistance in MOSH adoption
- Limited visibility from CPS suppliers regarding products readiness.
- No **industry level technical** requirement from the mines to suppliers
- No adoption of the standardized technical (MOSH) requirement by SAMI
- Mines knowledge of the legal requirement and the MOSH blueprint



NCEWS CPS – NCEWS Journey

Progress Reporting – TRL4 Tests

Formal CPS tests done by UP										
Status as at 4 Dec 2024										
Test		Systems to be tested (est.)	Engaging	Order	Tested	Passed	Passed Dec 2023	% Passed	% Passed 2023	IMP
CxD TRL4	CxD (complete)	23	23	5	3	1	0	4%	0%	4%
	4.1 Interface	23	21	17	15	14	2	61%	9%	52%
	4.2 Log keeping	23	21	14	13	6	1	26%	4%	22%
	4.3 Self-diagnostics	23	18	12	11	8	1	35%	4%	30%
	4.4 Detection & Tracking	23	15	5	4	1	0	4%	0%	4%
	4.5 Effective Warning	23	15	5	4	1	0	4%	0%	4%
	4.6 CxD controller	23	15	5	3	1	0	4%	0%	4%
TMM TRL4	TMM (complete)	30	22	11	8	3	1	10%	3%	7%
	4.1 Interface	30	22	14	14	11	3	37%	10%	27%
	4.2 Log keeping	30	19	12	11	10	2	33%	7%	27%
	4.3 Self-diagnostics	30	18	12	11	8	1	27%	3%	23%
	4.4 Machine sensing	30	17	11	8	3	1	10%	3%	7%
	4.5 Machine controller	30	17	11	8	3	1	10%	3%	7%

TRL4 Stage Gate Report

MOSH Collision Prevention System Underground CxD TRL4 Stage Gate Report

Supplier: Embedded IQ
Product: PAS1000 Proximity Avoidance System
Reference: EiQ.PAS1000.4.SG.3
Date: 2024/10/24

Version	Date	Change description	Authors	Sign
1	2024-02-15	Released to client	HA Hamersma	
2	2024-10-11	Updated with Detection & Tracking and Effective Warning test result	HA Hamersma	
3	2024-10-24	Updated with Controller test result	HA Hamersma	

MOSH TRL4 test	Test date	Reference	Result
CxD ISO/TS 21815-2:2021	2023-05-17	EiQ.PAS1000.4.CI.2	Accept
CxD Log keeping	2023-05-17	EiQ.PAS1000.4.LK.2	Provisionally accept
CxD Self-diagnostics	2023-05-17	EiQ.PAS1000.4.SD.2	Accept
Underground CxD Detection and tracking	2024-08-30	EiQ.PAS1000.4.UDT.1	Accept
Underground CxD Effective warning	2024-08-29	EiQ.PAS1000.4.UEW.1	Accept
Underground CxD Controller (Interaction scenarios)	2024-08-30	EiQ.PAS1000.4.UCC.1	Accept

TMM TRL4 status	Recommendation
Complete	Ready for higher TRL testing



NCEWS CPS – Reflection and Current Reality

Progress Reporting – Mines

NORTHERN CAPE MINES															
MINE NAME	2.13.1 ENGINEER NAME	S	PD	TFRA	TS	TM	UPTS	UPTC	TS	TC	IS	IC	IF	FTS	FC
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Legend	
	Done
	In progress
	Overdue

LEGEND	DESCRIPTION
PD	1st PRESENTATION TO DMRE DONE
TFRA	TRAFFIC FLOW + RISK ANALYSIS REVIEW
TFRAR	TRAFFIC FLOW + RISK ANALYSIS DONE
TM	TRAFFIC MANAGEMENT DONE
TS	CPS TEST SPEC
UPTS (TRL 4)	UP TESTS STARTED
UPTC	UP TESTS COMPLETED
STS	SITE TESTING STARTED
STC	SITE TESTS COMPLETE
IS	INSTALLATION STARTED
IC	INSTALLATION COMPLETE
IF	INTERFACE TESTED AT UP
FC	FULLY COMPLIANT
S	STARTED

REALITY...



NCEWS CPS – Reality

Fundamental Challenges

Mines don't speak with one voice



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graph TD; A[Mines don't speak with one voice] --> B[Risk of installation prior to Testing – Learn by Collisions]; B --> C[Fundamental enhancements on TMM are required – legal implications]; C --> D[Most TMM supplied by international companies therefore long implementation cycle- Mines forced to go 3rd Party]; D --> E[Significant combination of TMM configurations to be tested]; E --> F[CPS is a very complex safety system];
```

Risk of installation prior to Testing – Learn by Collisions

Fundamental enhancements on TMM are required – legal implications

Most TMM supplied by international companies therefore long implementation cycle- Mines forced to go 3rd Party

Significant combination of TMM configurations to be tested

CPS is a **very** complex **safety** system

HOW DO WE ESTABLISH A CREDIBLE COMPLIANCE DATE FOR THE REGULATOR?

NEXT STEPS





NCEWS CPS – NCEWS Journey

Next Steps.....

- NC CPS compliance proposal to NC DMRE
- Seek collaboration with other regions (Mines & DMRE)
- Stakeholder knowledge sharing sessions – training on developed material.
 - CPS supplier ISO 21815 – 2021
 - CPS – March 2025
 - Traffic Management April 2023
- Move CPS suppliers towards testing and compliance

- Move mines forward with Traffic Management
- CPS supplier exhibition – 05 Dec 2024
- International supplier individual engagements – Since February 2024 - ongoing
- Workshop with BWE/Caterpillar – 26/27 Nov 2024
- Collaboration session with other regions ??



REQUEST?

- Adopt CPS blueprint
- Participate in CPS engagements
- Collaborate with NCEWS





Conclusion



Progress has been observed in testing with our **local and 3rd party interface CxD suppliers**. This advancement is a testament to the collaborative efforts and the strong working relationships established within these groups.



Despite these successes, we continue to face **challenges** in our testing processes with **international suppliers**.



The recent CPS workshop provided valuable feedback, underscoring the necessity for **alignment and time** to achieve full compliance. This feedback will be critical in shaping our approach as we work towards resolving these issues and enhancing our overall testing framework.



We seek to **collaborate** with **other regions** in driving the suppliers towards compliance and implementation of these regulations.

END

