



# Vehicle Interaction Control Effectiveness

## BASELINE FACILITATOR GUIDE

*Preparation and delivery of a baseline validation workshop*



# DOCUMENT CONTROL

## 1. REVISION HISTORY

Rev	Date	Description	Prepared by	Checked by	Approved by
1.0	July 2024	Document developed and published	- Eve McDonald - Tony Egan	Tony Egan	Tony Egan

## 2. DISCLAIMER

While every attempt has been made to validate the contents of this Vehicle Interaction Control Effectiveness (VICE) Baseline Facilitator Guide, the content has been collated from industry leading practice and therefore may change over time. For this reason, EMESRT reserves its right to update and re-issue the Guide as industry practice evolves.

## 3. CONDITIONS OF USE

EMESRT has an ambition to reduce the health and safety risks from operating and maintaining mobile earth moving equipment. This is achieved by sharing leading practice information that can be referenced by users and designers when seeking to reduce the level of risk to personnel. Connecting through a community collaboration of; end users, OEM's, researchers, and third-party suppliers it allows a deep understanding of the problems needed to be addressed to support industry level improvement.

### 3.1 TRANSLATIONS

This VICE Baseline Facilitator Guide was developed and reviewed in English only. If the Guide is translated, only the English version published by EMESRT is the approved version.

### 3.2 USAGE

- EMESRT makes the VICE Baseline Facilitator Guide accessible to all of industry at no cost
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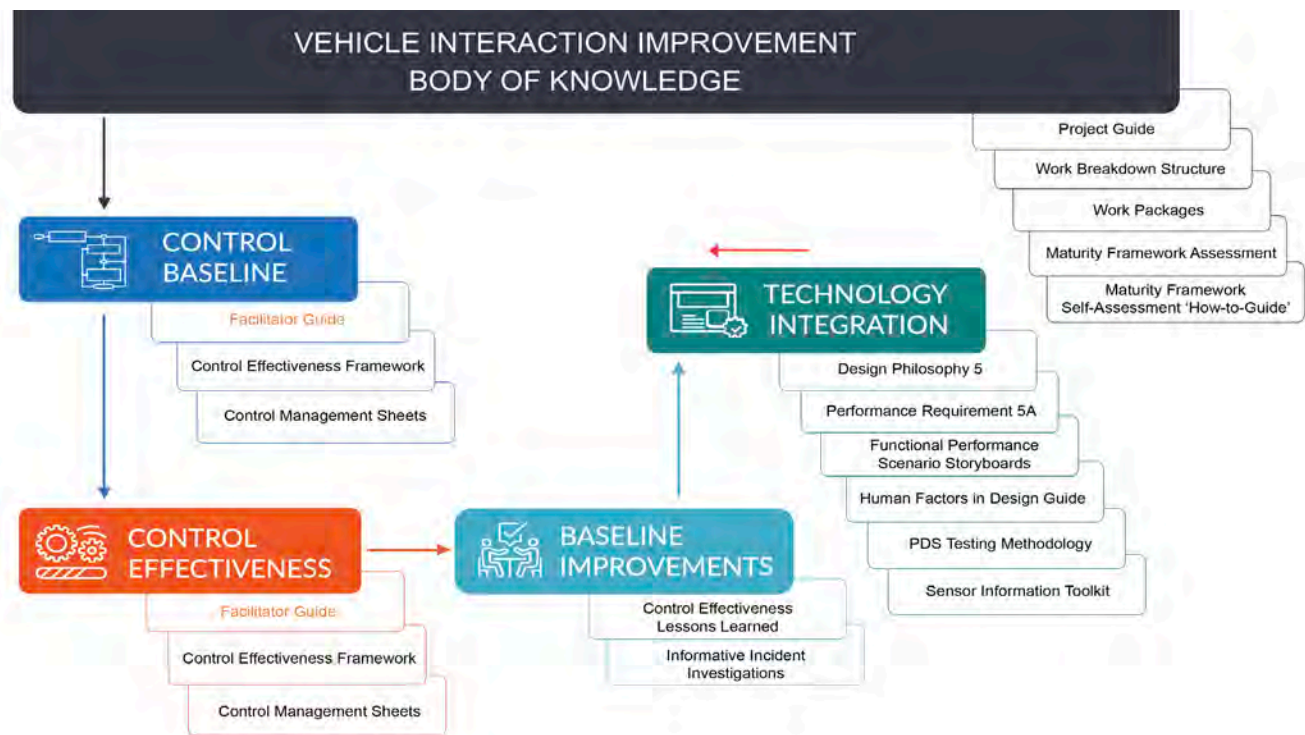
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The diagram below provides an understanding of where the Facilitator Guide integrates into the overall Vehicle Interaction Control Improvement industry resources.



# INTRODUCTION

This resource provides a process overview and details for multiple roles during the deployment of Phase 1 and 2 of the EMESRT Vehicle Interaction Control Effectiveness Baseline Mapping Facilitator Guide.

Phase 1 – Understand your vehicle interaction control baseline i.e., know where you are starting from.

Phase 2 – Identify and correct any gaps between the baseline design and current operations.

It has been developed to assist operating sites in the resources industry deliver successful projects to improve vehicle interaction controls.

- Facilitator guide notes
- Process - Phase 1: Vehicle interaction baseline preparation
- Project manager and facilitator checklist
- Process - Phase 2: Validation workshop
- Report with plan to restore and maintain vehicle interaction control

# PURPOSE

The overall objective of this guide is to provide consistent structured guidance for resource industry operating sites, so that they can deliver projects that improve Vehicle Interaction (VI) controls.



THE TERMS VEHICLE INTERACTION (VI) AND MOBILE EQUIPMENT INTERACTION (MEI) HAVE THE SAME MEANING. BOTH TERMS HAVE BEEN USED IN EMESRT DOCUMENTS AND INDUSTRY FORUMS AND ARE INTERCHANGEABLE.



# DEFINITIONS AND GLOSSARY

TERM	DEFINITION
<b>BI</b>	<p>A business input is the lowest part of the hierarchical Control Effectiveness context structure. In the Control Effectiveness, Business Inputs report to Credible Failure Modes (CFM).</p> <p>Business Inputs prevent or mitigate Credible Failure Modes (CFM) from compromising Required Operating States (ROS).</p> <p>Each BI has a unique reference and name and lists details of what the BI is expected to achieve (expectation), where it is defined (specification), how it is operationalised (implementation), and how its status is assessed (monitoring).</p> <p>Business Inputs are based on industry leading practice and continue to evolve.</p>
<b>CFM</b>	<p>A Credible Failure Mode (CFM) is the mid layer of the hierarchical Control Effectiveness context structure. In the Control Effectiveness, Credible Failure Modes report to Required Operating States (ROS).</p> <p>Credible Failure Modes are the loss of control situations that can compromise one of more Required Operating State (ROS).</p> <p>Each CFM has a unique reference and name and lists details of what can cause the loss of control.</p> <p>CFM can be validated by cross referencing incidents.</p>
<b>Control Effectiveness</b>	<p>Control Effectiveness is an EMESRT analysis technique that is aligned with Failure Modes and Effects Analysis. It is based on a three-level hierarchical context structure of:</p> <ul style="list-style-type: none"> <li>■ Required Operating State (ROS)</li> <li>■ Credible Failure Modes (CFM)</li> <li>■ Business Inputs (BI)</li> </ul> <p>Applying the Control Effectiveness analysis technique establishes both a 'whole of system' overview and a structure that is linked to detailed operational practice.</p> <p>Working this way provides information and insights about the dynamic interconnects between personnel, equipment, the work environment, work groups carrying out different tasks and their overall coordination.</p> <p>This promotes the systematic identification of improvement opportunities.</p>
<b>CMS</b>	<p>A printed output from the Control Effectiveness analysis spreadsheet is organised by operational ROS, listing CFM and Business Inputs. Control Management Sheets (CMS) are key resources for small group work during the Control Effectiveness validation workshop.</p>
<b>EMESRT</b>	<p>Earth Moving Equipment Safety Round Table.</p>

## DEFINITIONS AND GLOSSARY *cont...*

TERM	DEFINITION
<b>MEI</b>	<p>Mobile Equipment Interaction.</p> <p>Note: Vehicle Interaction (VI) and Mobile Equipment Interaction (MEI) have the same meaning in this procedure. Both terms have been used in EMESRT documents and industry forums and are interchangeable.</p>
<b>PDS</b>	<p>Proximity Detection System.</p>
<b>ROS</b>	<p>A Required Operating State (ROS) is the top level of the hierarchical Control Effectiveness context structure. In a Control Effectiveness analysis technique, Required Operating States (ROS) define the safe and productive outcomes relevant at an enterprise level for the Control Effectiveness subjects. They are linked to Credible Failure Modes.</p> <p>Each ROS has a unique reference and name and a description of the safe and productive outcomes that it delivers.</p> <p>There are two categories of Required Operating State (ROS).</p> <p>Five System Level Required Operating States (see the VI Control Mapping Template) – this ROS structure is useful for Phase 1 mapping and Phase 2 reporting and control restore planning because:</p> <ul style="list-style-type: none"> <li>■ ‘Like’ Business Inputs are grouped</li> <li>■ Business Inputs only appear only once allowing efficient mapping reporting and version control</li> </ul> <p>Thirteen Operational Required Operating States (see the control management sheets used for small group work in the validation workshop) – this ROS structure is essential for the validation workshop because:</p> <ul style="list-style-type: none"> <li>■ It frames the work around operational requirements</li> <li>■ It assists participants to understand the many to many relationships and hierarchy between Control Effectiveness components</li> </ul> <p>Business Inputs and Credible Failure modes can appear many times.</p>
<b>Validation Workshop</b>	<p>This validation workshop follows this iterative process:</p> <ol style="list-style-type: none"> <li>1. Review the Operational Required Operating State and confirm that it is relevant to safe and productive mobile equipment operations for this site</li> <li>2. Review each Credible Failure Mode and confirm that the operational scenarios apply, and it can compromise the Required Operating State being reviewed</li> <li>3. Then review each linked Business Input to confirm that it can prevent or mitigate the Credible Failure Mode from compromising the Required Operating State</li> <li>4. Based on operational practice review and update details on how the Business Input is:             <ol style="list-style-type: none"> <li>a. Specified</li> <li>b. Implemented</li> <li>c. Monitored</li> </ol> </li> </ol> <p>This format and work cycle provides participants with a whole system overview and an operational context as they review each Business Input in detail.</p>

TERM	DEFINITION
VI	<p>Vehicle Interaction.</p> <p>Note: Vehicle Interaction (VI) and Mobile Equipment Interaction (MEI) have the same meaning in this procedure. Both terms have been used in EMESRT documents and industry forums, and are interchangeable.</p>
<b>Vehicle Interaction Control Mapping Template</b>	<p>The VI Control Mapping Template organises Business Inputs into five categories:</p> <ol style="list-style-type: none"> <li>1. Personnel are trained, competent, authorised, alert, informed and situationally aware</li> <li>2. Equipment - tools and consumables are fit for use, available, used and maintained</li> <li>3. Work Environment - hazards in the operating environment are identified and managed</li> <li>4. Interactions between work groups carrying out different tasks are well managed</li> <li>5. System optimisation - there is a whole of system overview of activities that deliver safe and productive outcomes, when necessary, modifications are made</li> </ol> <p>Then within each spreadsheet tab the <i>Business Inputs</i> are sorted into these subcategories:</p> <ul style="list-style-type: none"> <li>■ Design – there is a process design that meets needs</li> <li>■ Operate – the designed process is implemented</li> <li>■ Supervisory Control and Data Acquisition – the process performance is measurable, the ‘operate’ state is monitored and maintained for safe and productive outcomes</li> <li>■ Abnormal Threat Response – safe and productive operating states can be recovered i.e. the process can be restored</li> </ul> <p>Grouping the business inputs this way assists the control (business input) mapping process because it aligns with organisational processes and accountabilities, for example:</p> <ul style="list-style-type: none"> <li>■ Personnel processes are designed and supported by Human Resources and Training</li> <li>■ Equipment specification, pre use approval, calibration and maintenance etc, are managed by the Technical or Engineering function</li> <li>■ The work environment and work group interactions are part of operational planning</li> </ul>

# VEHICLE INTERACTION CONTROL IMPROVEMENT PROJECT

This EMESRT resource is provided to assist resource companies who have committed to improving vehicle interaction controls in their operations by selecting and operationally integrating new technology ‘react’ controls.

EMESRT supports this commitment by providing a multi-phase Vehicle Interaction Control Improvement project template. The project phases relevant to this facilitator guide are:

- **Phase 1:** Establish a Vehicle Interaction Control Baseline
- **Phase 2:** Confirm existing Vehicle Interaction Control Effectiveness

Company personnel preparing for and facilitating VI Control Improvement Baseline workshops should be familiar with these project resources:

- EMESRT Vehicle Interaction Control Improvement Project Guide 2023
- Company standards, related procedures and guidance notes relevant to vehicle interaction
- EMESRT Vehicle Interaction Control Mapping Template





# PHASE 1: VEHICLE INTERACTION CONTROL BASELINE PREPARATION

## OBJECTIVES

The objective for Phase 1 is to prepare a site Vehicle Interaction Control Baseline of current mobile equipment interaction controls that captures details from:

- Work process documentation – procedures, standards, work instructions, etc
- Records of operational practice e.g. equipment pre-start and maintenance checks, shift communication logs, training assessments, equipment operation authorization, etc
- Interviews with knowledgeable and experienced site personnel
- Reviews of site and sector vehicle interaction incidents
- External expectations - legal and company

## OUTPUTS

The outputs from Phase 1 Vehicle Interaction Control Baseline Preparation are:

- Version 1 of the site Vehicle Interaction Control Baseline, prepared from the VI Control Mapping
- Template, that includes relevant site content identified with specific references, notes, assumptions, and questions to be resolved by workshop participants
- A list of all documents reviewed noting those referenced in site baseline and those that were not relevant
- A list of the experienced and knowledgeable personnel who have contributed to the baseline
- A register of relevant legislative requirements
- A review of site relevant incidents with cross references to Credible Failure Modes
- Validation workshop control management sheets organised around 13 Operational Required Operating States



DO NOT UNDERESTIMATE THE TIME AND RESOURCES REQUIRED TO COMPLETE THIS PREPARATION STEP. INADEQUATE PREPARATION WILL RESULT IN SUBOPTIMAL VALIDATION WORKSHOP OUTCOMES.

## PHASE 2: VALIDATION WORKSHOP

### OBJECTIVES

The Phase 2 Workshop Objective is to review, update and validate version 1 of the site Vehicle Interaction Control Baseline.

### OUTPUTS

The key workshop outputs are:

- Version 2 of the site Vehicle Interaction Control Baseline
- A report that identifies opportunities for improvement for current vehicle interaction controls
- Process experience participants who can advise and contribute to future project steps

### POST WORKSHOP VI CONTROL RESTORE AND MAINTAIN PLAN

Use the validation workshop opportunities for improvement report to:

- Identify and group the opportunities for improvement, e.g. operational planning improvements, personnel support improvements, etc
- Prepare a plan to close any gaps and present for senior management review



A MINIMUM FOUR-WEEK LEAD TIME IS REQUIRED TO COORDINATE AND PREPARE FOR THE PHASE 2 VALIDATION WORKSHOP.

## TIMINGS

Phase 1 Vehicle Interaction Control Baseline Preparation should be scheduled to begin at least four weeks before the validation workshop. This minimum lead time allows for:

- Sourcing and mapping work process documentation
- Sourcing and mapping operational practice records (evidence that work processes are being applied and their design is satisfactory)
- Reviewing site and sector incident history
- Identifying and mapping external to site expectations - legal and company
- Reviewing progress with knowledgeable site personnel

This minimum four-week lead time is also required to coordinate and prepare for the Phase 2 Validation Workshops by:

- Briefing senior managers about the VI Control Improvement Project and their leadership role
- Confirming and inviting participants
- Selecting and preparing a suitable workshop venue

The Phase 2 validation workshop takes two full days with all participants. Selected workshop participants will attend for further day to prepare a draft improvement plan for senior management review.

Preparation of a report of the workshop process and outcomes, including Version 2 of the Site Vehicle Interaction Baseline typically takes a further 3-5 days. This work can be undertaken by either the workshop facilitator, project manager or both.

## ROLE OF SENIOR LEADERS

Brief Senior Leaders on their role for project phases 1 and 2 covering:

- The 'Company' Vehicle Interaction Control Improvement Strategy
- Details of the Site Vehicle Interaction Control Improvement Plan
- An overview of the EMESRT VI Control Improvement approach as a five phase Business Improvement Process
- Phase 1 VI control mapping process (see invitation)
- The timing and structure of the Phase 2 Validation Workshop

## SELECTING WORKSHOP PARTICIPANTS

Workshop participants should be representative of the workforce who manage vehicle interaction hazards. The following roles should be represented:

- Mobile Equipment Operators
- Supervisors of mobile equipment operators
- Equipment Maintainers
- Technical staff, e.g. engineering
- Workforce representatives with health and safety skills
- Risk and safety team members
- Training personnel
- Senior managers / decision makers
- Others, e.g. contractors

Select participants who are influencers and natural leaders. Ensure that there are enough senior leaders to support each small working group.

A successful workshop requires a minimum of 12 personnel, and the process can be used groups of up to 30 people. Small group sizes work best between 4-6 personnel.



SELECT PARTICIPANTS WHO ARE INFLUENCERS AND NATURAL LEADERS.



# SUPPORT MATERIAL

Use the checklist columns to coordinate preparation of Phase 1: Vehicle control baseline and Phase 2: Validation workshop.

## PHASE 1: VEHICLE INTERACTION CONTROL BASELINE MAPPING PREPARATION

- Vehicle Interaction Control Mapping Template
- This VICE Baseline Facilitator Guide

## PHASE 2: VALIDATION WORKSHOP

- Workshop Control Management Sheets template for A0 printing (841 mm x 1189 mm, 84.1 cm x 118.9 cm or 33.1 inches x 46.8 inches)
- Workshop posters for printing
- This Facilitator Guide
- Workshop Control Management Sheets – master spreadsheet for updating by workshop participants

## POST WORKSHOP VEHICLE INTERACTION CONTROL RESTORE AND MAINTAIN PLAN

- Opportunities for improvement reporting template
- Version 2 of the VI Control Baseline template
- Report structure template
- Including suggested Appendices









# PROCESS

## PROJECT MANAGER AND FACILITATOR CHECKLIST

Use the checklist columns to coordinate preparation of Phase 1 - VI Control Baseline and Phase 2 Validation Workshop.



# TIMELINE OF ACTIVITIES BEFORE WORKSHOP



## TIMELINE OF ACTIVITIES BEFORE WORKSHOP

Use the checklist columns to coordinate preparation of Phase 1: Vehicle control baseline and Phase 2: Validation workshop.

VI CONTROL BASELINE PREPARATION CHECKLIST	VALIDATION WORKSHOP CHECKLIST
<b>1. MINIMUM OF FOUR WEEKS BEFORE WORKSHOP</b>	
<p>Commence sourcing and mapping work process documentation including:</p> <ul style="list-style-type: none"> <li>■ Procedures</li> <li>■ Task instructions</li> <li>■ Operational records</li> <li>■ Training information - process and records</li> <li>■ Incident experience</li> <li>■ Standards</li> <li>■ Legislative requirements</li> <li>■ Company requirements</li> </ul>	<p>Announce PHASE 1 project commencement through a note from senior managers.</p>
<b>2. THREE WEEKS BEFORE WORKSHOP</b>	
<p>Continue to source and map work process documentation into the VI Control Mapping template.</p>	<p>Confirm that the venue for the workshop is adequate with space for large group work (all participants) and break out areas for at least four small groups.</p> <p>Select participants.</p>
<b>3. ONE TO TWO WEEKS BEFORE WORKSHOP</b>	
<p>Review progress with knowledgeable site personnel.</p>	<p>Invite participants.</p>



PREPARATION IS KEY TO DELIVERING A SUCCESSFUL VICE BASELINE WORKSHOP.

VI CONTROL BASELINE PREPARATION CHECKLIST	VALIDATION WORKSHOP CHECKLIST
<b>4. TWO TO FIVE DAYS BEFORE WORKSHOP</b>	
<p>Review of site operations by facilitator.</p> <p>Discuss VI Control Baseline map with knowledgeable personnel, amend and update as required.</p> <p>Covert VI Mapping format (System Required Operating State) to Validation Workshop Format (Operational Required Operating States).</p> <p>Prepare spreadsheets for each Operational Required Operating State for:</p> <ul style="list-style-type: none"> <li>■ Printing as Validation Workshop Control Sheets</li> <li>■ A shared resource for small group review work</li> </ul>	<p>Confirm venue resources and support:</p> <ul style="list-style-type: none"> <li>■ Flip charts</li> <li>■ White Boards</li> <li>■ Wall space to hang Control Sheets</li> <li>■ Projector and screen</li> <li>■ Large group work area – if possible, work without tables</li> <li>■ Small group areas for at least four groups</li> <li>■ Amenities</li> <li>■ Tea coffee</li> <li>■ Lunch</li> </ul>
<b>5. ONE DAY BEFORE WORKSHOP</b>	
<p>Print validation workshop posters and control management sheets in A0 size.</p> <p>Print reference material covering Credible Failure Modes and Business Input details.</p>	<p>Prepare the room:</p> <ul style="list-style-type: none"> <li>■ Hang posters</li> <li>■ Set up large group area – recommend circle of chairs set up</li> </ul>
<b>6. DAY OF WORKSHOP</b>	
<p>During the introduction confirm the phase 1 baseline mapping input that has been completed to make the workshop a success covering:</p> <ul style="list-style-type: none"> <li>■ Number of documents reviewed</li> <li>■ External expectations mapped</li> <li>■ Interviews, etc</li> </ul> <p>Challenge the group to ‘mark this homework’ and identify gaps and opportunities.</p>	<p>Welcome participants:</p> <ul style="list-style-type: none"> <li>■ Ask them to sign in</li> <li>■ Point out tea and coffee areas</li> <li>■ Commence the workshop</li> </ul>





# PROCESS

## PHASE 1 VI CONTROL BASELINE PREPARATION

This section provides a step-by-step description of the process to prepare a Phase 1 Vehicle Interaction Control Baseline.

## TIMELINE OF ACTIVITIES BEFORE WORKSHOP



## STEP 1: ANNOUNCE PHASE 1 OF THE VI CONTROL IMPROVEMENT PROJECT

ACTIVITY	RESPONSIBLE: PROJECT MANAGER OR LEAD FACILITATOR WORKING WITH SITE MANAGEMENT
<p>It is recommended that senior site management launch the site VI Control Improvement Project with a note to relevant managers and functional leads that describes both Phase 1 and Phase 2 process steps.</p> <p>The note should confirm:</p> <ul style="list-style-type: none"> <li>■ A project intent to review and improve site VI Controls</li> <li>■ An outline of the VI Control baseline and validation steps</li> <li>■ Timing and logistics</li> <li>■ Roles and accountabilities</li> </ul>	<p>See sample Phase 1 note to senior managers and functional leads.</p> <p>Note: this information is separate and complementary to the Phase 2 validation workshop invitation.</p>

## STEP 2: USE THE VI CONTROL MAPPING TEMPLATE TO PREPARE A SITE VI CONTROL BASELINE

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>Read the EMESRT VI Control Improvement Guideline 2020.</p> <p>Review the work packages from Step 2: Establish a VI Control Framework Baseline (Phase 1).</p> <p>Source the VI Control Mapping Template appropriate to the language that you will be working in.</p> <p>Set up the template using the Site VI Control Improvement Project Name. It is already be populated with:</p> <ul style="list-style-type: none"> <li>■ Required Operating States</li> <li>■ Credible Failure Modes</li> <li>■ Business inputs</li> </ul> <p>Use this document to record all information directly and indirectly relevant for preparing the site VI Control Baseline.</p>	<p>EMESRT have prepared VI Control Mapping Templates.</p> <p>Key information from relevant work packages in MEI Control Improvement Procedure are used in this facilitator guide.</p> <p>Hint – set up extra tabs in your mapping spreadsheet to capture external requirements, incident analysis, key procedures, training packages etc, before mapping them into the ROS tabs.</p>

### STEP 3: CONFIRM CURRENT SITE VI CONTROL EXPECTATIONS

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>Identify and list legislative and other external requirements that are relevant for site Vehicle Interaction controls. Consider:</p> <ul style="list-style-type: none"> <li>■ General legislative requirements e.g. Duty of Care</li> <li>■ Specific mobile equipment legislative requirements e.g. use of proximity detection systems, brake testing for underground equipment, roll over protection etc.</li> <li>■ Any other external requirements that are relevant to vehicle interaction prevention or mitigation controls e.g. cabin integrity standards etc</li> <li>■ Consider Acts, Regulations, Codes of Practice and Guidelines relevant to the operating jurisdiction</li> </ul> <p>Review leading practice sector resources that are site relevant e.g. ICMM and EMESRT Case Studies.</p> <p>Confirm and list your Company / Site Standards that are relevant to site VI Controls such as:</p> <ul style="list-style-type: none"> <li>■ Driving standards, related procedures and guidance notes</li> <li>■ Fatigue management leading practice expectations</li> </ul> <p>Identify and record any site-specific variations for VI Controls such as:</p> <ul style="list-style-type: none"> <li>■ Equipment specifications e.g. Falling Object Protection System (FOPS) when loading from hoppers</li> <li>■ Interfaces with the public, train lines, etc</li> <li>■ Map the site variation details into relevant business inputs, include new business inputs if required</li> </ul>	<p>Talk to senior operational, engineering and maintenance personnel. Ask specific questions about vehicle interactions at the operation.</p> <p>Identify conditions and circumstances that are local e.g. interaction with trains, working around water, extreme weather conditions, public interfaces, etc.</p>





## STEP 4: CARRY OUT AN VI INCIDENT ANALYSIS AND CONFIRM THE CREDIBLE FAILURE MODES

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>Carry out a Vehicle Interaction incident analysis by:</p> <ul style="list-style-type: none"> <li>■ Sourcing 3- 5 years of site vehicle interaction incident records</li> <li>■ Reviewing incident information from non-company sites operating in the same jurisdiction and region</li> <li>■ Reviewing ‘Company’ site vehicle incidents from similar operations</li> </ul> <p>Review the Credible Failure Modes from EMESRT VI Control Framework template to:</p> <ul style="list-style-type: none"> <li>■ Confirm that they are site relevant</li> <li>■ Analyse the site, region, and sector incident information to confirm that all incident types can be assigned to Credible Failure Modes</li> <li>■ As required, add new Credible Failure Modes</li> <li>■ Identify any <b>Credible Failure Modes</b> that are not site relevant</li> </ul>	<p>Consider company, regulator reports and other information.</p> <p>Use the EMESRT document ‘Credible Failure Modes with detailed descriptions’ to review relevance for site.</p> <p>For example, some Credible Failure Modes from underground mining may not be relevant to smelter or refinery operating environment.</p>



SOURCE 3-5 YEARS OF SITE VEHICLE INTERACTION INCIDENT RECORDS, REVIEW INCIDENT INFORMATION FROM NON-COMPANY SITES OPERATING IN THE SAME JURISDICTION AND REGION.



## STEP 5: SOURCE AND MAP SITE VI CONTROL DETAILS TO PREPARE A VERSION 1 BASELINE

### OPTION 1: INITIAL OFF-SITE MAPPING OF CURRENT DOCUMENT VI CONTROLS

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>Review the site VI Control Baseline Mapping spreadsheet resource. Read the instructions for use (first tab).</p> <p>Source site documents that provide information about current site VI Controls such as:</p> <ul style="list-style-type: none"> <li>■ Work process documentation – procedures, Traffic Management Plans, Mobile Equipment Specifications, standards, work instructions, etc</li> <li>■ Records of operational practice e.g. equipment pre-start and maintenance checks, shift communication logs, training assessments, equipment operation authorization, etc</li> </ul> <p>Review each document to:</p> <ul style="list-style-type: none"> <li>■ Identify its purpose</li> <li>■ Confirm if it is relevant to the VI Control Baseline</li> <li>■ Using the site VI Control Baseline map, identify Business Inputs that correspond the document</li> <li>■ Cut and paste relevant document extracts into Business Inputs</li> <li>■ Provide specific references (section, step, or other location details)</li> <li>■ As required, make notes about the site documentation of current VI controls directly into the VI Control Baseline</li> </ul>	<p>This build option works best when the people preparing the VI Control Baseline are not based at the operating site.</p> <p>Working this way ensures that the facilitator is familiar with current site VI controls, and a partial Baseline can be referenced during interviews with site personnel.</p> <p>It is important to have some site input review of Version 1 of the VI Control Baseline, before the validation workshop.</p> <p>If mapping is incomplete and has not been reviewed by site personnel, there may be disagreements during the workshop about the accuracy of current VI Control mapping i.e. work as documented.</p> <p>Remember, the power of the validation workshop comes from group discussions and comparisons between <b><i>'work as documented'</i></b> and <b><i>'work as done'</i></b>.</p>

**STEP 5: SOURCE AND MAP SITE VI CONTROL DETAILS TO PREPARE A VERSION 1 BASELINE** *cont...*

**OPTION 2: INITIAL ON-SITE MAPPING OF CURRENT DOCUMENTED VI CONTROLS**

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>Review the site VI Control Baseline Mapping Resource, begin with the instructions for use tab.</p> <p>Consider each spreadsheet tab and identify knowledgeable people who can assist mapping site processes against the Business Inputs organised by the following System Required Operating States (ROS).</p>	<p>This build option works best when the people preparing the VI Control Baseline are based at the operating site.</p> <p>Grouping the business inputs this way assists the control (business input) mapping process because it aligns with organisational processes and accountabilities.</p> <p>Working this way ensures that accountable site personnel become fully engaged in the process and the version 1 Baseline Map is comprehensive.</p> <p>This ensures that the validation work can immediately compare 'work as documented' to 'work as done'.</p>
<p><b>PERSONNEL</b> - Operators and all people working around mobile equipment are trained, competent, authorised, informed, alert and situationally aware.</p>	<p>Knowledgeable People who can assist with VI Baseline mapping for this System ROS:</p> <ul style="list-style-type: none"> <li>■ Human Resources</li> <li>■ Training</li> <li>■ Health and Safety</li> </ul>
<p><b>EQUIPMENT</b> - Mobile Equipment is fit for use, key systems are functioning.</p>	<p>Engage with engineering, maintenance, and supply personnel.</p> <p>Look for information covering how mobile equipment is selected, commissioned, inspected, maintained, pre-use check lists etc.</p> <p>This may include operations and maintenance manuals, new equipment specifications etc</p> <p>Knowledgeable People who can assist:</p> <ul style="list-style-type: none"> <li>■ Mobile equipment maintenance</li> <li>■ Engineering – re purchase new equipment</li> </ul>

## STEP 5: SOURCE AND MAP SITE VI CONTROL DETAILS TO PREPARE A VERSION 1 BASELINE *cont...*

### OPTION 2: INITIAL ON-SITE MAPPING OF CURRENT DOCUMENTED VI CONTROLS *cont...*

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p><b>ENVIRONMENT</b> - The operating environment for mobile equipment is satisfactory, hazards are identified and managed.</p>	<p>Work with operations, training and HSE personnel.</p> <p>Sources may include protocols for approaching mobile equipment, mine design, lighting requirements, traffic management, queuing, parking, use of barriers and demarcation, dust control, loading and dumping, changes in operating conditions etc.</p> <p>Knowledgeable people who can assist:</p> <ul style="list-style-type: none"> <li>■ Operations superintendents</li> <li>■ Ventilation officer</li> <li>■ Technical services manager</li> </ul>
<p><b>INTERFACES</b> - Mobile Equipment interfaces with pedestrians and other units (interactions between work groups carrying out different tasks) are well managed.</p>	<p>Work with mine planning and operations personnel.</p> <p>Knowledgeable people who can assist</p> <ul style="list-style-type: none"> <li>■ Mine planning</li> <li>■ Operations superintendents or Mine Foreman</li> </ul>
<p><b>SYSTEM OPTIMISATION</b> - Mobile equipment management is well coordinated, practical and integrated with routine operational and business processes. There is a whole of system overview of activities that deliver safe and productive outcomes, when necessary, modifications are made.</p>	<p>Work with senior operations personnel.</p> <p>Look for information covering the management of contractor mobile equipment, mine design guidelines, change management, fatigue management processes, accountabilities for managers and planners. Sources may include risk registers.</p> <p>Knowledgeable People who can assist:</p> <ul style="list-style-type: none"> <li>■ Technical Services Manager</li> <li>■ Mine Manager</li> <li>■ Emergency Response personnel</li> <li>■ Health and Safety</li> </ul>

**STEP 5: SOURCE AND MAP SITE VI CONTROL DETAILS TO PREPARE A VERSION 1 BASELINE *cont...***

**OPTION 2: INITIAL ON-SITE MAPPING OF CURRENT DOCUMENTED VI CONTROLS *cont...***

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>Ask the knowledgeable people to confirm that each Business Input is relevant.</p> <p>Ask the knowledgeable people to confirm how the site meets each relevant Business Input including details of:</p> <ol style="list-style-type: none"> <li>Where is this Business Input specified? <i>Document specific references from relevant: Plans, Work Processes, Training Resources, Procedures, Guidelines, Forms, Assessments, Policies, Specifications, Designs etc</i></li> <li>Has the Business Input been well implemented? <i>Describe the implementation process: Is it adequate, consistent, reliable, and repeatable?</i></li> <li>Is the status of Business Inputs monitored as part of normal operations? <i>Describe how the status of this business input is assessed?</i></li> <li>Cut and paste relevant document extracts into the Business Inputs</li> <li>Provide specific references (section details)</li> </ol> <p>As required, make notes about the site documentation of current VI controls directly into the VI Control Baseline.</p>	<p>Reviewing Business Input Expectations assists in deciding the site relevance of each Business Input.</p> <p>The information included in the Specification, Implementation and Monitor columns is for guidance, it comes from EMESRT Standards and Industry leading practice information.</p> <p>Preparing a VI Control Baseline using the Control Effectiveness analysis technique is a time consuming and exacting task.</p> <p>If you are under-prepared, then the validation workshop step will take longer and be less effective.</p> <p>Allow at least 4 weeks to complete this mapping work.</p> <p>The EMESRT leading practice Vehicle Interaction Control Effectiveness has these components:</p> <ul style="list-style-type: none"> <li>■ 102 Business Inputs</li> <li>■ 81 Credible Failure Modes</li> <li>■ 13 Operational Required Operating States used for the phase 2 validation workshop</li> </ul> <p>5 System Level Required Operating States (used for phase 1 Business Input mapping and for phase 2 Control Restore planning).</p>



## STEP 6: REVIEW VI CONTROL MAPPING WITH KNOWLEDGEABLE SITE PERSONNEL

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>After completing an initial review of site documents, schedule interviews with knowledgeable and experienced site personnel to review content based on the five VI Control Baseline Mapping spreadsheet tabs.</p> <p>At each interview, review mapping progress for each relevant Business Input:</p> <ol style="list-style-type: none"> <li>Review expectation and reconfirm that it is site relevant</li> <li>For each relevant Business Input, ask for their description of how the site meets the BI Expectation</li> <li>Show them what current documented controls have been identified and how they have been mapped (across specification, implement and monitor)</li> <li>Check to see if mapping is incomplete</li> <li>Correct and update as required</li> </ol> <p>Update the baseline by adding new information, notes and references etc.</p>	<p>It is useful and efficient to provide details of VI Control mapping before any interviews.</p> <p>Extract the appropriate tab from the mapping sheet and provide it in PDF format so that interviewees can print and add their notes before the interview.</p>



WORK WITH KNOWLEDGEABLE PEOPLE WHO CAN ASSIST WITH VEHICLE INTERACTION BASELINE MAPPING.



## STEP 7: PREPARE VALIDATION WORKSHOP VI CONTROL BASELINE SHEETS

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>The last step in Phase 1 to prepare control management sheets for the VI Baseline Validation Workshop.</p>	<p>Flipping the from System ROS to the Operational ROS used for the validation workshop is essential because:</p>
<p>These are prepared by converting the Five System Level Required Operating States from the VI Control Mapping document into the thirteen Operational Required Operating States listed below. Review each of the 13 Required Operating States, tab by tab in the Control Effectiveness spreadsheet.</p>	<ul style="list-style-type: none"> <li>■ It frames the work around operational requirements</li> <li>■ It assists participants to understand the many to many relationships and hierarchy between Control Effectiveness components</li> <li>■ Version control of Business Inputs is maintained during the VI Control Map build phase</li> </ul>
<p><b>ROS 01</b> Operator maintains adequate clearances / distance.</p>	
<p><b>ROS 02</b> Vehicle operators give way appropriately to mobile plant and pedestrians.</p>	
<p><b>ROS 03</b> Operators drive vehicles at speeds which meet site rules and local conditions.</p>	<p>This step can be completed by copying the BI detail into the Control Sheet Template or using the VI Project consultant software platform.</p>
<p><b>ROS 04</b> Operators do not drive vehicles when impaired.</p>	
<p><b>ROS 05</b> Operators park vehicles in positions that avoid unwanted interactions.</p>	
<p><b>ROS 06</b> Physical barriers provide separation.</p>	
<p><b>ROS 07</b> Alarms alert operators to nearby hazards and operator takes appropriate action.</p>	
<p><b>ROS 08</b> When a vehicle component alarms the operator responds appropriately.</p>	
<p><b>ROS 09</b> Loads are appropriate for vehicle type and site conditions, items are secured during travel.</p>	
<p><b>ROS 10</b> Access control - vehicle operators limit movements / activities to designated areas.</p>	
<p><b>ROS 11</b> Seat belts are used by vehicle operators and occupants.</p>	
<p><b>ROS 12</b> Cabin protection is in accordance with site standards.</p>	
<p><b>ROS 13</b> Emergency responders manage injuries at the scene.</p>	
<p>Print out each ROS on A0 sheets for the validation workshop (VI Baseline Control Management Sheets).</p>	

## OUTPUTS FROM PHASE 1 VI CONTROL BASELINE PREPARATION

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>The outputs from Phase 1 Vehicle Interaction Control Baseline Preparation are:</p> <ul style="list-style-type: none"> <li>■ Version 1 of the site Vehicle Interaction Control Baseline, prepared from the VI Control Mapping Template, that includes relevant site content identified with specific references, notes, assumptions, and questions to be resolved by workshop participants</li> <li>■ A list of all documents reviewed noting those referenced in site baseline and those that were not relevant</li> <li>■ A list of the experienced and knowledgeable personnel who have contributed to the baseline</li> <li>■ A register of relevant legislative requirements</li> <li>■ A review of site relevant incidents with cross references to Credible Failure Modes</li> <li>■ Validation workshop control management sheets organised around 13 Operational Required Operating States</li> </ul>	<p>Cross reference Section 2.</p> <p>Manager and Facilitator Checklist.</p>



OUTPUTS FROM PHASE 1 INCLUDE A REVIEW OF SITE RELEVANT INCIDENTS WITH CROSS REFERENCES TO CREDIBLE FAILURE MODES.







# PROCESS

## PHASE 2 VALIDATION WORKSHOP

This section provides a step-by-step description of the process to facilitate a Phase 2 Vehicle Interaction Control Baseline Mapping Validation Work.



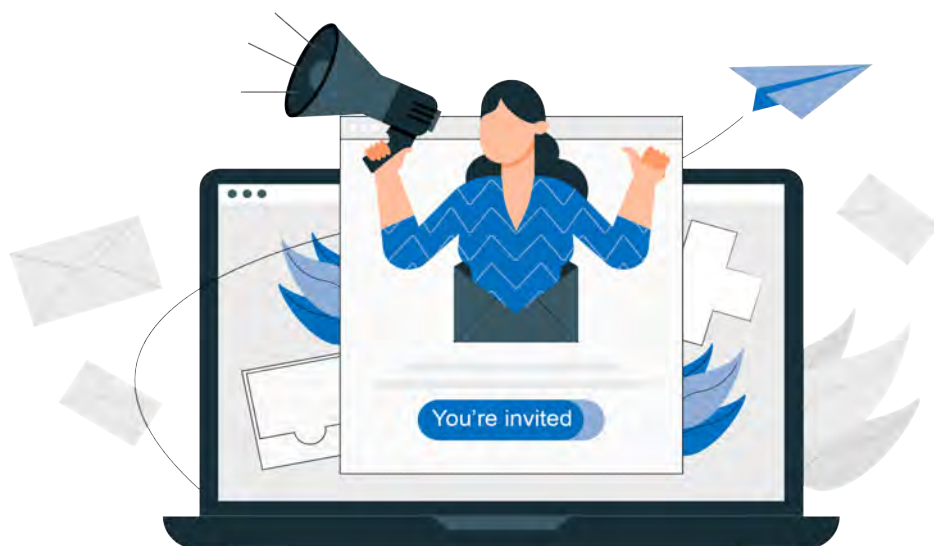


## TIMELINE OF ACTIVITIES

STEP 1	INVITE PARTICIPANTS
STEP 2 - DAY 1	SESSION 1: WELCOME AND INTRODUCTION SESSION 2: GROUP WORK AND FEEDBACK
STEP 2 - DAY 2	SESSION 3: CONTINUE GROUP WORK AND FEEDBACK SESSION 4: PROGRESS FEEDBACK TO SENIOR MANAGERS SESSION 5: WORKSHOP CLOSE



ENSURE LINE MANAGERS KNOW ABOUT THE WORKSHOP BEFORE ISSUING THE INVITATION.



## STEP 1: WORKSHOP PLANNING - SELECTING AND INVITING PARTICIPANTS

ACTIVITY	RESPONSIBLE: PROJECT MANAGER SUPPORTED BY PROJECT SPONSOR
<p>Workshop participants should be representative of the workforce who manage vehicle interaction hazards. The following roles should be represented:</p> <ul style="list-style-type: none"> <li>■ Mobile Equipment Operators</li> <li>■ Supervisors of mobile equipment operators</li> <li>■ Equipment Maintainers</li> <li>■ Technical staff e.g. engineering</li> <li>■ Workforce representatives with health and safety skills</li> <li>■ Risk and safety team members</li> <li>■ Training personnel</li> <li>■ Senior managers / decision makers</li> <li>■ Others e.g. contractors</li> </ul> <p>Select participants who are influencers and natural leaders. Ensure that there are enough senior leaders to support each small working group.</p> <p>A successful workshop requires a minimum of 12 personnel, and the process can be used for groups of up to 30 people. Small group sizes work best between 4-6 personnel.</p>	<p>Make sure that Phase 1 Baseline preparation is on schedule for completion before committing to the validation workshop.</p> <p>Discuss the make-up of participants with site-based personnel. Consider role, expected contribution, and influence post workshop.</p>
<p>Send out invitations to those selected for the validation workshop. The invitation should confirm:</p> <ul style="list-style-type: none"> <li>■ Project intent to review and improve site VI Controls</li> <li>■ An outline of the VI control baseline and validation steps</li> <li>■ Confirm the invitation is based on expected contribution, knowledge, and experience</li> <li>■ Your contribution will be to review, correct and update the VI Control baseline analysis to reflect real world operations</li> <li>■ From this baseline review and update, plans will be prepared to improve the reliability and performance of VI controls, including considering using technology</li> <li>■ Participants are expected to provide information, advice, and guidance to the project team over the life of the project</li> <li>■ Timing</li> <li>■ Location</li> </ul> <p>Senior Manager and Workshop Facilitator sign the invitation letter.</p>	<p>Ensure line managers know about the workshop before issuing the invitation.</p> <p>See sample Invitation letter in resources.</p>



## STEP 1: WORKSHOP PLANNING - SELECTING AND INVITING PARTICIPANTS *cont...*

ACTIVITY	RESPONSIBLE: PROJECT MANAGER SUPPORTED BY PROJECT SPONSOR
<p>Confirm that the venue for the workshop is adequate with enough space for large group work (all participants) and break out areas for at least four small groups.</p> <p>Venue logistics :</p> <ul style="list-style-type: none"> <li>■ Allow for up to 30 personnel for large group work (all participants).</li> <li>■ Small group work with group sizes of 4-6 workshop participants</li> <li>■ Small group work involves A0 printed control management sheets on walls i.e. you must be able to hang the control management sheets so that they can be read and edited</li> <li>■ Reserve large group space before the workshop so that you have time to prepare the room</li> <li>■ Reserve a small group space for improvement planning on day 3</li> </ul>	<p>Large group work without desks or tables assists in establishing a purpose and forming the group.</p> <p>Consider using a circle of chairs for large group sessions.</p>
<p>Confirm venue resources and support:</p> <ul style="list-style-type: none"> <li>■ Flip charts</li> <li>■ White boards</li> <li>■ Wall space to hang control management sheets</li> <li>■ Projector and screen</li> <li>■ Large group work area – if possible, work without tables</li> <li>■ Small group areas for at least four groups</li> <li>■ Amenities</li> <li>■ Tea coffee</li> <li>■ Lunch</li> </ul> <p>Prepare the room:</p> <ul style="list-style-type: none"> <li>■ Hang posters</li> <li>■ Set up large group area – recommend circle of chairs set up</li> </ul>	

## STEP 1: WORKSHOP PLANNING - SELECTING AND INVITING PARTICIPANTS *cont...*

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>Team Session Information / Resources.</p> <p>Arrange to have the following available :</p> <ul style="list-style-type: none"> <li>■ General arrangement plans - that give layout information on the roadways and vehicle interaction locations on the site</li> <li>■ Surface aerial photographs of relevant areas of the site</li> <li>■ Idea sharing devices (whiteboard, flip chart, post-it notes, etc,) in each room</li> <li>■ Confirm food, coffee and bathrooms</li> <li>■ Red pens, A0 printing of version 1 of baseline control management sheets</li> <li>■ Coffee and lunch</li> </ul>	<p>Print the VI baseline control management sheets ROS 1-2 days before the validation workshop.</p>

## STEP 2: VI CONTROL BASELINE VALIDATION WORKSHOP

### SESSION 1: OPENING, OVERVIEW AND INTRODUCTIONS

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>Welcome participants:</p> <ul style="list-style-type: none"> <li>■ Ask them to sign in</li> <li>■ Point out tea and coffee areas</li> </ul> <p>Commence the workshop Welcome:</p> <ul style="list-style-type: none"> <li>■ Participant welcome by facilitator</li> </ul> <p>Opening:</p> <ul style="list-style-type: none"> <li>■ Workshop opening by senior manager (use invitation as a useful reference)</li> <li>■ Introduction of facilitators (capture their years in the industry)</li> </ul>	<p>Hang the starting set of A0 control management sheets before the workshop begins.</p> <p>Prepare you own facilitator run sheet and keep that at hand.</p>



AVOID USING PROJECTORS FOR THE WORKSHOP.  
USE FLIP CHARTS INSTEAD.

## STEP 2: VI CONTROL BASELINE VALIDATION WORKSHOP *cont...*

### SESSION 1: OPENING, OVERVIEW AND INTRODUCTIONS *cont...*

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>Overview:</p> <ul style="list-style-type: none"> <li>■ Provide an overview of ‘Company’ Vehicle Interaction Control Improvement project.</li> <li>■ The intent of the workshop, i.e. validation of the VI Control Baseline Control Effectiveness before considering technology controls.</li> <li>■ Refer to the EMESRT Nine Layer Model of Control Effectiveness (see posters available on the EMESRT body of knowledge)</li> <li>■ Provide an overview of the VI Control Baseline preparation work e.g. we reviewed 200+ documents and spoke to 20 people, it took us 4 weeks etc.</li> <li>■ Say today’s session is about you ‘marking this homework.’</li> </ul> <p>Participant Introductions:</p> <ul style="list-style-type: none"> <li>■ Ask each workshop participant to introduce themselves, model how you want it done covering:                             <ul style="list-style-type: none"> <li>◦ Their name</li> <li>◦ Where they work and what they do</li> <li>◦ Years in the industry (total these for all participants)</li> <li>◦ Why effective control of vehicle interaction is important to them</li> </ul> </li> <li>■ Capture key points from each introduction.</li> </ul> <p>Total up the participant years and say you are prepared to let them mark your homework.</p>	<p>We suggest that you avoid using projectors for the workshop.</p>



USE FLIP CHART EXPLAINING CONTROL FRAMEWORK STRUCTURE - CONSIDER DRAWING IN REAL TIME.



**STEP 2: VI CONTROL BASELINE VALIDATION WORKSHOP** *cont...***SESSION 1: OPENING, OVERVIEW AND INTRODUCTIONS** *cont...*

ACTIVITY	RESPONSIBLE: LEAD FACILITATOR
<p>Confirm venue resources and support:</p> <ul style="list-style-type: none"> <li>■ Flip charts</li> <li>■ White boards</li> <li>■ Wall space to hang control management sheets</li> <li>■ Projector and screen</li> <li>■ Large group work area – if possible, work without tables</li> <li>■ Small group areas for at least four groups</li> <li>■ Amenities</li> <li>■ Tea coffee</li> <li>■ Lunch</li> </ul> <p>Prepare the room:</p> <ul style="list-style-type: none"> <li>■ Hang posters</li> <li>■ Set up large group area – recommend circle of chairs set up</li> </ul>	
<p>Train workshop participants in the control management sheet</p> <p>Review process:</p> <ul style="list-style-type: none"> <li>■ Draw the 4 quadrant Balance Model and use it to explain how the Control Effectiveness analysis technique can assist organisations by: <ul style="list-style-type: none"> <li>◦ Removing clutter</li> <li>◦ Preventing fatalities</li> <li>◦ Integrating with how work is really done</li> </ul> </li> <li>■ Explain the structure of a Control Effectiveness: <ul style="list-style-type: none"> <li>◦ Required Operating States</li> <li>◦ Credible Failure Modes</li> <li>◦ Business inputs</li> </ul> </li> <li>■ Working from the butcher's paper use a simple example e.g. access control to explain the concept</li> </ul>	<p>Flip chart explaining Control Effectiveness structure – consider drawing it in real time.</p>

## STEP 2: VI CONTROL BASELINE VALIDATION WORKSHOP *cont...*

### SESSION 1: OPENING, OVERVIEW AND INTRODUCTIONS *cont...*

ACTIVITY	RESPONSIBLE: WORKSHOP FACILITATOR
<p>Large group review of a control sheet:</p> <ul style="list-style-type: none"> <li>■ Ask the large group to stand up and work together to review one of the simpler control management sheets e.g.                             <ul style="list-style-type: none"> <li>◦ ROS 05 - Operators park vehicles in positions that avoid unwanted interactions</li> <li>◦ ROS 09 - Loads are appropriate for vehicle type and site conditions, items are secured during travel.</li> <li>◦ ROS 10 - Access Control - Vehicle operators limit movements / activities to designated areas</li> </ul> </li> <li>■ Confirm that they understand the intent of the chosen ROS</li> <li>■ Check that the Credible Failure modes are relevant, and if any are missing</li> <li>■ Work through the business inputs                             <ul style="list-style-type: none"> <li>◦ Ask if that is how things work around here?</li> <li>◦ Make edits with red pens</li> </ul> </li> <li>■ Beyond the edits, capture opportunities for improvement</li> <li>■ Use post-it notes for further details</li> </ul> <p><b>Confirm that participants understand the process.</b></p>	<p><i>Use post-it notes to capture opportunities for improvement.</i></p> <p><i>Encourage red pen mark-ups.</i></p>
<p>Preparing to move to Session 2:</p> <p>Decide on make-up of small groups based on information provided during introductions and advice from site management.</p> <ul style="list-style-type: none"> <li>■ Ensure groups have a mix of skills and are balanced</li> <li>■ Ensure that each participant knows what small group they will be working in</li> </ul> <p><b>End session 1 and go to a break.</b></p>	<p><i>Ask participants to return at a set time.</i></p>

**STEP 2: VI CONTROL BASELINE VALIDATION WORKSHOP *cont...***

**SESSION 2: SMALL GROUP WORK ON VI BASELINE CONTROL MANAGEMENT SHEETS WITH REGULAR LARGE GROUP FEEDBACK**

ACTIVITY	RESPONSIBLE: FACILITATED SMALL GROUPS
<p>When people return assign each small group a working area.</p> <ul style="list-style-type: none"> <li>■ Confirm that each participant knows where they are going.</li> <li>■ For the first review round assign small groups to appropriate Control Sheets e.g. those groups with maintenance personnel to                             <ul style="list-style-type: none"> <li>◦ ROS 08 - When a Vehicle Component alarms the operator responds appropriately</li> </ul> </li> <li>■ And small groups with Operations and Trainers to                             <ul style="list-style-type: none"> <li>◦ ROS 06 - Physical barriers provide separation or</li> <li>◦ ROS 09 - Loads are appropriate for vehicle type and site conditions, items are secured during travel</li> </ul> </li> </ul> <p><b>Get the groups working productively ASAP.</b></p> <p>Small group working on a control management sheet.</p>	<p>Issue many red pens and post-it notes.</p> <p>Encourage everyone to contribute, ensure that people rotate through roles.</p> <p>Trust the process – people will step up i.e. it does not need to be facilitator led.</p> <p>Provide a set of reference materials to each small group:</p> <ul style="list-style-type: none"> <li>■ Details of all Business Inputs</li> <li>■ Credible Failure Mode details</li> </ul> <p>Observe the small group work, support people to understand and apply the approach.</p> <p>The quality of discussions and content generated will confirm the level of understanding.</p>



ASSIGN SMALL GROUPS TO APPROPRIATE CONTROL SHEETS, DOES NOT NEED TO BE FACILITATOR LED - TRUST THE PROCESS.



## STEP 2: VI CONTROL BASELINE VALIDATION WORKSHOP *cont...*

### SESSION 2: SMALL GROUP WORK ON VI BASELINE CONTROL SHEETS WITH REGULAR LARGE GROUP FEEDBACK *cont...*

ACTIVITY	RESPONSIBLE: FACILITATED SMALL GROUPS
<p>Small group feedback</p> <ul style="list-style-type: none"> <li>■ As each group completes their first review, pause the other groups at a convenient time for a summary of the validation work:                             <ul style="list-style-type: none"> <li>◦ Ask them to summaries the ROS and confirm the credible failure modes</li> <li>◦ Ask for any significant edits or opportunities for improvement identified for business inputs</li> <li>◦ Encourage further opportunities for improvement</li> </ul> </li> </ul> <p>Ensure that the working groups have breaks for lunch but allow them to work at their own pace.</p> <p>Small group progress feedback is essential for:</p> <ul style="list-style-type: none"> <li>■ Monitoring progress</li> <li>■ Capturing useful content</li> <li>■ Developing trust between small groups a business inputs requires just one detailed review</li> <li>■ To confirm that the context has been considered for repeated business inputs (gray shaded) by reviewing the linked Credible Failure Mode (CFM) and Required Operating State (ROS)</li> <li>■ Additional Business Input details added to gray shaded repeated business inputs should be explained during large group feedback</li> </ul>	<p><i>Small group feedback will accelerate during the validation workshop.</i></p> <p><i>Encourage people providing the feedback to concentrate on the non-shaded business inputs i.e. those that are new.</i></p> <p><i>Monitor small group progress and plan for the next control management sheets.</i></p> <p><i>It is useful to begin updating the Control Effectiveness baseline during the workshop. This enables facilitators to ask questions and ensure that they get the information that they need. Take photos of completed sheets.</i></p> <p><i>Consider asking participants to capture progress directly to the VI baseline control management sheets on shared drives.</i></p>



**STEP 2: VI CONTROL BASELINE VALIDATION WORKSHOP** *cont...***SESSION 2: SMALL GROUP WORK ON VI BASELINE CONTROL MANAGEMENT SHEETS WITH REGULAR LARGE GROUP FEEDBACK** *cont...*

ACTIVITY	RESPONSIBILITY: LEAD FACILITATOR
<p>The VI Control Baseline Validation Workshop follows this iterative process:</p> <ol style="list-style-type: none"> <li>1. Review the Operational Required Operating State and confirm that it is relevant to safe and productive mobile equipment operations for the site</li> <li>2. Review each Credible Failure Mode and confirm that the operational scenarios apply, and it can compromise the Required Operating State being reviewed</li> <li>3. Then review each linked Business Input to confirm that it can prevent or mitigate the Credible Failure Mode from compromising the Required Operating State</li> <li>4. Based on operational practice review and update details on how the Business Input is:               <ol style="list-style-type: none"> <li>a. Specified</li> <li>b. Implemented</li> <li>c. Monitored</li> </ol> </li> </ol>	<p><i>This format and work cycle provides participants with a whole system overview and an operational context as they review each Business Input in detail.</i></p> <p><i>All ROS are usually relevant.</i></p> <p><i>Some CFM depend on site operations but remember CFM relevance was considered during baseline mapping.</i></p> <p><i>When updating Business Inputs based on operational practice ask the small groups to identify gaps and provide details of <b>'opportunities for improvement'</b>.</i></p> <p><i>Ask for operational examples that explain the gaps.</i></p>



ENSURE THAT THE WORKING GROUPS HAVE BREAKS FOR LUNCH BUT ALLOW THEM TO WORK AT THEIR OWN PACE.



### 1. Confirm Required Operating States (ROS)

- What is the required operating state?
- What performance outcomes can we expect from working in this required operating state?

### 3c. Business Input - Monitor

- How do we get signal that this Business Input is working as intended?
- How do we respond to Business Input drift?
- Can we identify if the issue is through inadequate design or implementation?

Required Operating State - Name ROS 03 - Operators drive vehicles at speeds which meet site rules and local conditions Required Operating State (ROS) Intent Reduce the potential for loss of control of equipment due to incorrect speed for the conditions. Nil loss of control of equipment caused by incorrect speed for the conditions.	Credible Failure Mode <i>What credible failure modes can compromise the ROS? (The compromise may be through absence, full or partial failure of a business input)</i>	Business Input with Expectation	Business Input Specification <i>Please describe how your site currently delivers this expectation is there a defined site process? If yes, please copy and paste relevant extracts into your answer below</i>	Business Input Implementation <i>Please describe how the site process is implemented and maintained</i>	Business Input Monitoring <i>Describe how you assess the status of site process How often are the assessments carried out? Are the assessments part of your normal operations?</i>
	CFM.1CD-01 Operator unaware of correct speed Operator not aware of correct speed, caused by: Unaware of maximum operating speed limits for Light/Heavy Vehicles on site by type and travel routes Does not recognise change in work environment e.g. not at correct crest speed for the ramp, adverse weather conditions, slippery road etc. Towing equipment Lack of awareness due to inconsistent or missing signage around reavelling site speed limits CAS/PDS geofences or site speeds not set up or maintained	BI-01P.01 Trained, Competent and Authorised Mobile Equipment Operators All workers who operate mobile equipment at the mine are trained and assessed for competency. This covers equipment operation, other worker/infrastructure protection and maintaining control in the prevailing road conditions.	All workers who operate mobile equipment at the mine (and other workers who interact with vehicles) are required to be trained and assessed for competency (as relevant) covering: Wearing seatbelts Ensuring that passengers wear seatbelts or other restraints Not transporting passengers in buckets, trays etc. Correct operating techniques (including identifying and honouring no-go zones around mobile equipment) Equipment load limits - weight and dimensions Site requirements for loading and unloading detailing: 1. Load security and stability based on site conditions and requirements; 2. Precautions to be taken when tipping loads (including identifying clays etc. which could cause vehicle instability when trays/tubs/buckets are raised). Brake and retarder use during equipment operation Electrical isolation Identification of electrical hazards Completion of pre-start inspections Preparation before servicing and maintenance Use of refuelling equipment and refuelling procedures Park-up procedures Identification and reporting of poor road, delineation, windrows/bunds, road pavement conditions Parking in the event of a flat tyre Identifying and responding to mechanical/electrical faults whilst driving Response to vehicle fires Responding to obstructions/pedestrians in road/travel ways Use of remote controlled equipment and responding to unintended operations/movements Site emergency requirements Prevention of and response to tyre fires including activating the fire	Mobile equipment operator training is delivered to schedule. Where applicable training is supported by use of equipment simulators - to safely confirm competency in emergency/unwanted situations (mechanical/electrical faults, fire, emergency stop, over-speed, sticky loads, etc.) TMP introduction to be renewed every year via web-based training. Operators need to attend equipment training separately depending on equipment model. Then need to extend operators qualification every 2 years as a group. Tableau report generated based on operator hour on each equipment. If operating hour is less than 12 hours in 3 months period on each equipment then qualification removed and notified to direct leader.	Reports are prepared on the training status and the skills matrix is regularly updated. Routine audits of the training management system are commissioned and reviewed by senior personnel. All training activities are monitored through LMS. TMP for operators are not controlled fully. There is a chance to operate equipment with expired TMP qualification as the equipment group qualification is 2 years and TMP qualification is one year. Tableau report not generated last year because of COVID situation. Process is being re-commenced now.
		BI-01P.07 Site specific travelling speed information prepared for vehicle operators Site travelling speeds by vehicle type are documented and communicated in a style that is appropriate for the audience.	Training modules for vehicle operators should include specific information travelling speed by vehicle type for all relevant scenarios. Training should be assessed to ensure that personnel understand vehicle speed expectations: At crests On curves In restricted or congested areas When towing When loaded When conditions change Both TMP introduction and equipment specific trainings are included information about speed control. Gears are locked for the equipment able to do over 20 km/hrs. A mobile equipment UG speed is 20kmph max. Some area requires speed limit such as: Pedestrian areas such as workshop, stations 10kmph Footprint areas (production) 5kmph <b>Key References</b> <b>Training Packs:</b> UG-06-TRN-0002-M-OTUG Underground TMP Introduction_v2.8 <b>Procedures:</b> UG-10-C3-PLN-0001-E-OT Underground Traffic Management	Training and assessment of vehicle operator understanding of safe travel speeds by vehicle type for a range of scenarios and conditions. Blue banners are presented at pre-starts to highlight relevant changes in the site requirements (speeds, intersections, etc.) Speed limit are set in the TMP (traffic management plan). Trainings: UG induction TMP Site driving license training Plastic equipment operator license is issued every time when operator extended or acquired new qualifications. All training activities managed through LMS. Higher gears are locked on the equipment. For main equipment, like LHD and haul truck, there is a system to monitor all violation including speeding and action plan generated to observe the behavior and improve performance.	Training system records confirm currency of vehicle operator skills Supervisors and peers monitor vehicle operator performance Vehicle monitoring with speed exceedance reports that identify the responsible operator. TMP training is renewed every year and equipment operating qualifications are renewed every 2 years as a group. OAR report is generated for main equipment and action plan raised if necessary. Higher gears are locked to limit speeding chance. All UG mobile equipment transmission setup for max speed 20kmph by maintenance team - regularly checked. Traffic speed radar detector is planned to install on UG main drive (not in place) Sometimes HSE conduct speed measurement in UG
		BI-025.05 Protocols for the calibration of key measuring equipment Measuring and position monitoring equipment is calibrated.	The site should have clear requirements for regular inspection and calibration testing of measuring equipment. This should include on site regular inspections by a qualified worker and use of an offsite provider for confirming the measuring equipment still meets relevant standards. Calibration of equipment should also cover any technology deployed, such as position systems and autonomous steering control systems. Site tooling is calibrated and inspected according to a quarterly/yearly maintenance schedule. The implementation of a computer-based tool tracking system allows for a navigable tool maintenance of all precision tooling	Site workers are trained in the use and testing of measuring equipment for pressure, braking, and other measures related to maintenance of equipment and measurement of as built conditions. Work orders are in place and issued by maintenance planners. Toolstoreman is responsible for escalating all non-conforming tools to the workshop supervisor. Workshop supervisor organises competent personnel and/or external services to calibrate tooling as required.	Work orders are closed out by maintenance planners on measuring equipment. There is a process to confirm the competence of personnel undertaking measuring/surveying tasks. Tool tracking software reporting function shows tooling overdue for calibration.

### 2. Confirm Credible Failure Modes (CFM)

- Review each Credible Failure Mode - consider operational scenarios and incident history
- Are the CFM relevant for this operating site?
- Could the CFM compromise the ROS?

### 3. Review each Business Input (BI)

- Will this Business Input prevent or mitigate the CFM from compromising the ROS?
- Is this Business Input relevant for our circumstances?

### 3a. Business Input - Specify

- Where is this Business Input documented or specified?

### 3b. Business Input - Implement

- How is each Business Input implemented?
- Are they integrated into how we operate?

## STEP 2: VI CONTROL BASELINE VALIDATION WORKSHOP *cont...*

### SESSION 2: CLOSE - END OF DAY 1

ACTIVITY	RESPONSIBLE: FACILITATOR
<p>Workshop close - reform as a large group and:</p> <ul style="list-style-type: none"> <li>■ Ask for feedback on the process.</li> <li>■ Confirm that participants are satisfied with the outcomes</li> <li>■ Outline day 2 work</li> <li>■ Complete a check out by asking each participant to describe the standout from their work on day 1</li> <li>■ When check out is completed, thank participants for their contribution</li> <li>■ Confirm the day 2 start time</li> </ul> <p>Ask a senior manager to close the workshop.</p>	<p><i>Consider using a circle of chairs for large group sessions.</i></p>

### SESSION 3: DAY 2 WELCOME AND CHECK IN

ACTIVITY	RESPONSIBLE: FACILITATOR
<p>Welcome participants:</p> <ul style="list-style-type: none"> <li>■ Ask participants to sign-in</li> </ul> <p>Recommence the workshop in large group space:</p> <ul style="list-style-type: none"> <li>■ Day 2 welcome back by facilitator</li> <li>■ Ask for any overnight reflections on the process and opportunities to improve vehicle interaction controls</li> <li>■ Describe the schedule for day 2 including the timing for feedback to senior managers</li> </ul> <p>Identify 3-4 people to prepare and deliver workshop feedback to senior managers.</p>	<p><i>Ask each participant to speak in turn during the check in.</i></p> <p><i>Allow 30 – 40 minutes.</i></p> <p><i>Capture improvement opportunities.</i></p> <p><i>The 3-4 people nominated to prepare and deliver the workshop feedback are expected to participate in Day 3 planning work.</i></p>



WELCOME PARTICIPANTS AND ASK EACH IN TURN TO SPEAK DURING THE CHECK IN.

**STEP 2: VI CONTROL BASELINE VALIDATION WORKSHOP cont...****SESSION 3: CONTINUE SMALL GROUP WORK ON VI BASELINE CONTROL MANAGEMENT SHEETS WITH REGULAR LARGE GROUP FEEDBACK**

ACTIVITY	RESPONSIBLE: FACILITATOR
<p>Continue with the VI Control Baseline Validation Workshop iterative process:</p> <ol style="list-style-type: none"> <li>1. Review the Operational Required Operating State and confirm that it is relevant to safe and productive mobile equipment operations for the site</li> <li>2. Review each Credible Failure Mode and confirm that the operational scenarios apply, and it can compromise the Required Operating State being reviewed</li> <li>3. Then review each linked Business Input to confirm that it can prevent or mitigate the Credible Failure Mode from compromising the Required Operating State</li> <li>4. Based on operational practice review and update details on how the Business Input is: <ol style="list-style-type: none"> <li>a. Specified</li> <li>b. Implemented and</li> <li>c. Monitored</li> </ol> </li> </ol>	<p><i>This format and work cycle provides participants with a whole system overview and an operational context as they review each Business Input in detail.</i></p> <p><i>All ROS are usually relevant.</i></p> <p><i>Some CFM depend on site operations but remember CFM relevance was considered during baseline mapping.</i></p> <p><i>When updating Business Inputs based on operational practice ask the small groups to identify gaps and provide details of <b>'opportunities for improvement'</b>.</i></p> <p><i>Ask for operational examples that explain the gaps.</i></p>
<p>Capture and update information from the small group work throughout the workshop. Review mark ups, post-it note comments and opportunities for improvement.</p> <p>Ask for operational examples that illustrate <i>'opportunities for improvement'</i>; include these in the updated VI control Baseline.</p> <p>Consider providing a link to the <i>'work as documented'</i> baseline and asking that small groups make notes as they carry out their review.</p> <p>If you use the Operational ROS Control Sheet set where repeated Business Inputs are shaded i.e. they only appear in full once, it is important to also capture any notes shaded Business Inputs.</p>	<p><i>Facilitators and co-facilitators should capture information as groups are working. Take photographs of every sheet for reference.</i></p> <p><i>If the notes are unclear, ask questions directly to the small groups, especially around opportunities for improvement.</i></p> <p><i>Make sure the small groups are working well before asking a member to directly update the baseline.</i></p> <p><i>While this is a useful efficiency step, remember that the power of the validation workshops is in the small group conversations.</i></p>



## STEP 2: VI CONTROL BASELINE VALIDATION WORKSHOP *cont...*

### SESSION 3: CONTINUE SMALL GROUP WORK ON VI BASELINE CONTROL MANAGEMENT SHEETS WITH REGULAR LARGE GROUP FEEDBACK *cont...*

ACTIVITY	RESPONSIBLE: FACILITATOR
<p>When groups complete their reviews a set of control management sheets by ROS, allocate them a new set of ROS control management sheets.</p> <p>As Session 3 continues, consider asking more than one small group to review separate sheets from the same ROS e.g. for Operators Maintain Clearance.</p>	<p><i>Where there are multiple control management sheets for larger ROS - on day 2 consider assigning these to more than one group.</i></p>

### SESSION 4: PROGRESS FEEDBACK TO SENIOR MANAGERS

ACTIVITY	RESPONSIBLE: SELECTED WORKSHOP PARTICIPANTS
<p>Monitor the progress on the review of control management sheets for Session 3 to make sure that all VI baseline control management sheets are reviewed.</p> <p>Reform the large group at least 90 minutes before the schedule feedback to senior managers.</p> <ul style="list-style-type: none"> <li>■ Ask the 3-4 people nominated to being preparing workshop feedback to senior managers</li> <li>■ Reallocate small group members if necessary</li> <li>■ Run the feedback preparation and the completion of VI baseline control management sheets concurrently</li> </ul> <p>Assist the feedback group to prepare and deliver a summary presentation for senior managers covering:</p> <ul style="list-style-type: none"> <li>■ An overview of the validation workshop process</li> <li>■ Headline findings (opportunities for improvement)</li> <li>■ Stress work required to restore current design and operate VI controls to expected control effectiveness</li> <li>■ Outline next steps – day 3 planning and a workshop report of workshop findings report that includes an updated VI Control Baseline</li> </ul> <p>Capture response from senior managers.</p>	<p><i>It is efficient to organise both:</i></p> <ul style="list-style-type: none"> <li>■ Findings (opportunities for improvement)</li> <li>■ Key elements for restoring current VI controls to expected control effectiveness</li> </ul> <p><i>Into the five System ROS used in the mapping template:</i></p> <ol style="list-style-type: none"> <li>1. People</li> <li>2. Equipment</li> <li>3. Operating environment</li> <li>4. Mobile equipment interactions</li> <li>5. System optimisation</li> </ol> <p><i>See reporting template.</i></p>

**STEP 2: VI CONTROL BASELINE VALIDATION WORKSHOP** *cont...***SESSION 5: VI CONTROL BASELINE WORKSHOP CLOSE**

ACTIVITY	RESPONSIBLE: FACILITATOR
<p>Workshop Close – working as large group:</p> <ul style="list-style-type: none"> <li>■ Summaries the next steps for improvement planning</li> <li>■ Confirm that participants are satisfied with the outcomes</li> <li>■ Complete a check out by asking each participant to describe the most important opportunities for improvement from the baseline review work</li> <li>■ Ask for senior manager for final comments last in the check out</li> <li>■ When check out is completed, thank participants for participating and close the workshop</li> </ul>	<p><i>Write the next steps down on butcher's paper or a whiteboard.</i></p> <p><i>Confirm that each opportunity for improvement identified by workshop participants has been collected and will be reviewed.</i></p> <p><i>Capture the two most important opportunities identified by participants.</i></p>



WRITE THE NEXT STEPS DOWN ON BUTCHER'S PAPER OR ON A WHITEBOARD.







The image shows three construction workers in blue uniforms and yellow hard hats. They are standing on a dirt surface, looking at a tablet held by the worker in the middle. The background features a large construction site with yellow machinery, including a bulldozer and a truck, and a large, rocky hillside under a cloudy sky. A semi-transparent dark blue rectangle is overlaid on the image, containing the text.

REPORT WITH PLAN TO  
RESTORE AND MAINTAIN  
VI CONTROL

# REPORT WITH PLAN TO RESTORE AND MAINTAIN VEHICLE INTERACTION CONTROL

## DAY 3 CONSOLIDATION AND PLANNING

During the second day of the workshop, before the feedback to senior managers confirm who can be available to review the validation workshop outputs, update the baseline, and assist with identifying and developing key themes for the report.

## REPORT PREPARATION

Review and adapt the report template, including appendices. The Phase 2 report audience is senior leaders.

The report provides a comprehensive and structured summary covering:

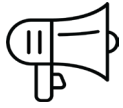
- An operationally validated baseline of 'design' and 'operate' vehicle interaction controls, in use at the operating site
- Structured information about gaps, so that plans to restore or improve vehicle interaction control reliability can be prepared and implemented
- A summary of site vehicle interaction controls mapped to EMESRT Safe Work Protocol SWP04-Mobile Equipment requirements
- A foundation reference for developing User Requirements, that will inform future decisions about enhancing existing, and introducing new, vehicle interaction controls
- Details of the experienced and knowledgeable workshop participants, who can provide information on operational status, advice, and guidance over the life of the Vehicle Interaction Control Improvement project



THE PHASE 2 REPORT AUDIENCE IS SENIOR LEADERS.







## KEY MESSAGES TO FACILITATORS

- Do not underestimate the time and resources required to complete the baseline preparation step.
- Extensive work is required to review and map the baseline information into the VI control mapping template.
- Inadequate preparation will result in suboptimal validation workshop outcomes.
- Preparation is key to delivering a successful baseline workshop.
- A minimum four-week lead time is required to coordinate and prepare for the Phase 2 validation workshop.
- Select workshop participants who are influencers and natural leaders.
- Source 3-5 years of site vehicle interaction incident records, review incident information from non-company sites operating in the same jurisdiction and region.
- Work with knowledgeable people who can assist with the baseline mapping.
- Ensure line managers know about the workshop before issuing the invitation.
- Avoid using projectors for the workshop, use flip charts instead.
- Consider drawing the control framework structure in real time on a flip chart.
- Assign small groups to appropriate control management sheets, this process does not need to be facilitator led, trust the process.
- Ensure the working groups have breaks for lunch but allow them to work at their own pace.
- Welcome participants and ask each in turn to speak during the check in.
- Write the next steps down on butcher's paper or a whiteboard.
- Phase 2 report audience is senior leaders.







## APPENDIX A: SUPPORTING RESOURCES

### EMESRT VI CONTROL IMPROVEMENT RESOURCES

This VICE Baseline Facilitator Guide is an EMESRT resource adapted for use by 'Company' personnel. It includes EMESRT techniques, concepts, support information and guidelines for the practical implementation of the Control Effectiveness.

It is recommended that facilitators become familiar with this technique and its associated VICI Project Guide work breakdown structure work packages. The work breakdown structure components relevant to this are available in Phase 1 and Phase 2 of the Guide.

The overall objective of the VICI Project Guide is to improve mobile equipment interaction (MEI) controls in the Business.

#### THE PROJECT IS BASED AROUND FIVE PHASES WITH THESE OBJECTIVES

- PHASE 1** Understand the site current vehicle interaction control baseline.
- PHASE 2** Identify and correct any gaps between the baseline design and current operations.
- PHASE 3** Enhance existing approaches, by selecting and implementing design and technology innovations that iteratively improve operations (doing what we do now – but better).
- PHASE 4** Identify and implement step change design and technology innovations that improve operations (replace or add to what we do now).
- PHASE 5** Fit the approach into the operating site and company digital strategy.



# APPENDIX B: PROJECT MANAGEMENT AND FACILITATOR CHECKLIST

## PREPARATION

### DOCUMENTATION SOURCES

- Procedure
- Task instructions
- Operational records
- Training information - process and records
- Incident experience
- Standards
- Legislative requirements
- Company requirements

### BEFORE WORKSHOP ACTIVITIES

- Mapping documentation into the VI Control
- Mapping template completed
- Progress reviewed with knowledgeable site personnel
- Announced Phase 1
- Selected and invited participants
- Reviewed site operations
- Discussed VI control baseline map with knowledgeable personnel, amended and updated as required
- Converted VI mapping format to validation workshop format
- Prepared spreadsheet for each operational required operating state for:
  - Printing as validation workshop control management sheets
  - A shared resource for small group review work
- Printed validation workshop poster and control management sheets in A0 size
- Printed reference material covering credible failure mode and business input details

### VENUE

- Confirmed venue is adequate with space for large group and break out areas for at least four small groups
- Flip chart
- White boards
- Wall space to hang control sheets
- Projector and screen
- Large group work area – if possible – work without tables
- Small group areas for at least four groups
- Access to amenities
- Water
- Tea and coffee
- Lunch

