A Review of the application of Continuous Real-Time Monitoring in Noise Risk Management

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PRESENTATION OUTLINE

NO.	ITEM
1.	Background
2.	Critical Control Management application in Continuous Real-Time Monitoring (CRTM)
3.	Continuous Real-Time Monitoring Considerations
4.	Continuous Real-Time Monitoring Application Review
5.	Challenges and Opportunities
6.	Conclusion

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BACKGROUND

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- The South African Mining Industry (SAMI) is one of the country's largest industry
- The processes associated with mining generate significant noise.
- The average noise exposure levels in the SAMI range between 63.0 and 113.5 dB(A).
- More than 50% of the mining population is exposed to more than the Occupational Exposure Limit of 85dB(A).
- Excessive exposure to noise has the following effects (not limited to):
    - Occupational Noise Induced Hearing Loss
    - Limiting the ability to communicate and hear warning signals
    - Impact on general safety and productivity
    - Poor quality of life

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BACKGROUND

R63BI

2022 Mining spending on machinery and equipment

Source: Statistics SA, Quantec

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BACKGROUND

The SAMI Tripartite committed to achieving **ZERO HARM** through the reduction of equipment noise emissions and ultimately eliminating noise induced hearing loss (NIHL):

- The total operational or process noise emitted by any equipment must not exceed a milestone sound pressure level of 107 dB(A) by December 2024
- In 2020, further commitment was made by CEOs to use CRTM to manage significant occupational health hazards

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TIMELINE

Industry Milestones Establishment

2003

Mining Industry Tripartite partners establish OHS Targets and Milestones

Industry Milestones Review

2013

Mining Industry Tripartite partners review OHS Targets and Milestones

Revision of Industry Milestones

2014

Mining Industry Tripartite partners establish new OHS Targets and Milestones

Review of Industry Milestone Performance

2020

- MCSA members agree on the need to raise the bar on the elimination of workplace exposures.
- Commodity specific task teams to identify significant occupational health hazards

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CRITICAL CONTROL MANAGEMENT APPLICATION IN CRTM

WHAT IS CRITICAL CONTROL MANAGEMENT

MATERIAL UNWANTED EVENT

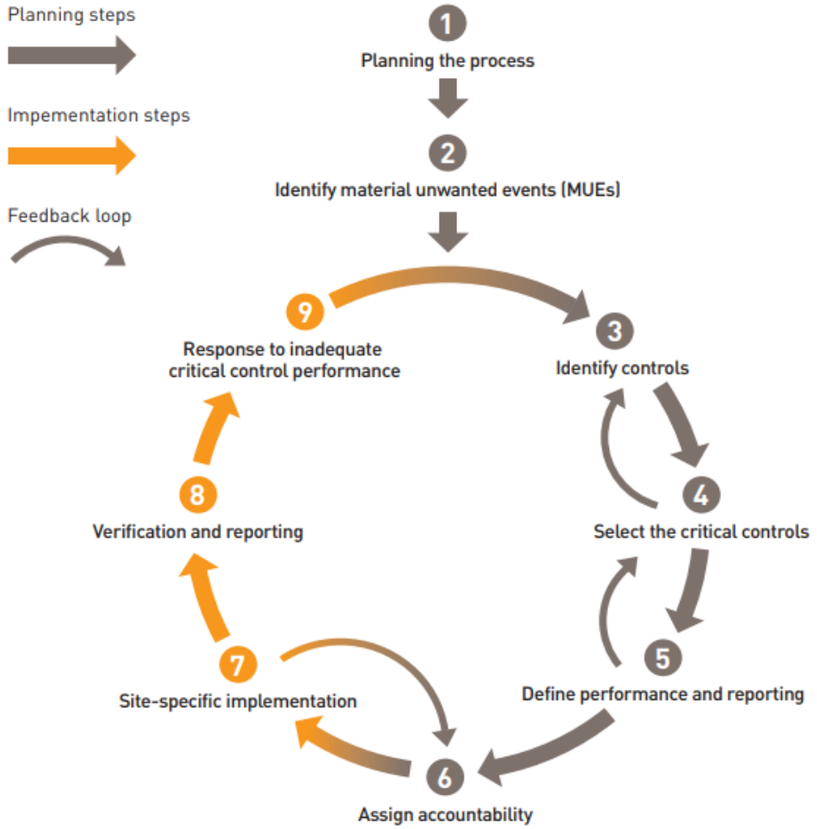
An unwanted event where the consequence exceeds a threshold defined by an operation

CRITICAL CONTROLS

A control that prevents the MUE from occuring

TARGET OUTCOME

Defining the outcomes in each step of Critical Control Management



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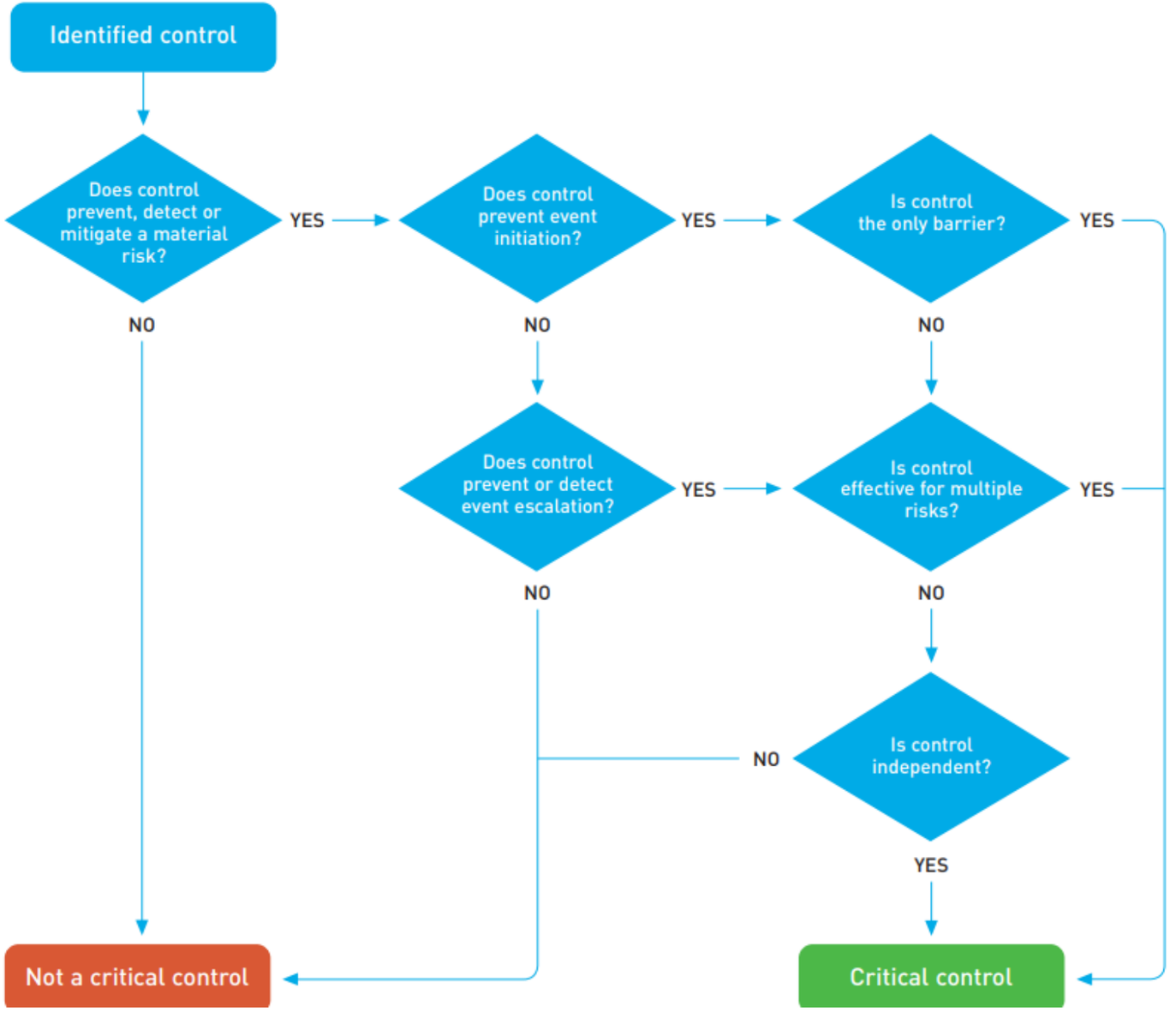
CRITICAL CONTROL DECISION TREE



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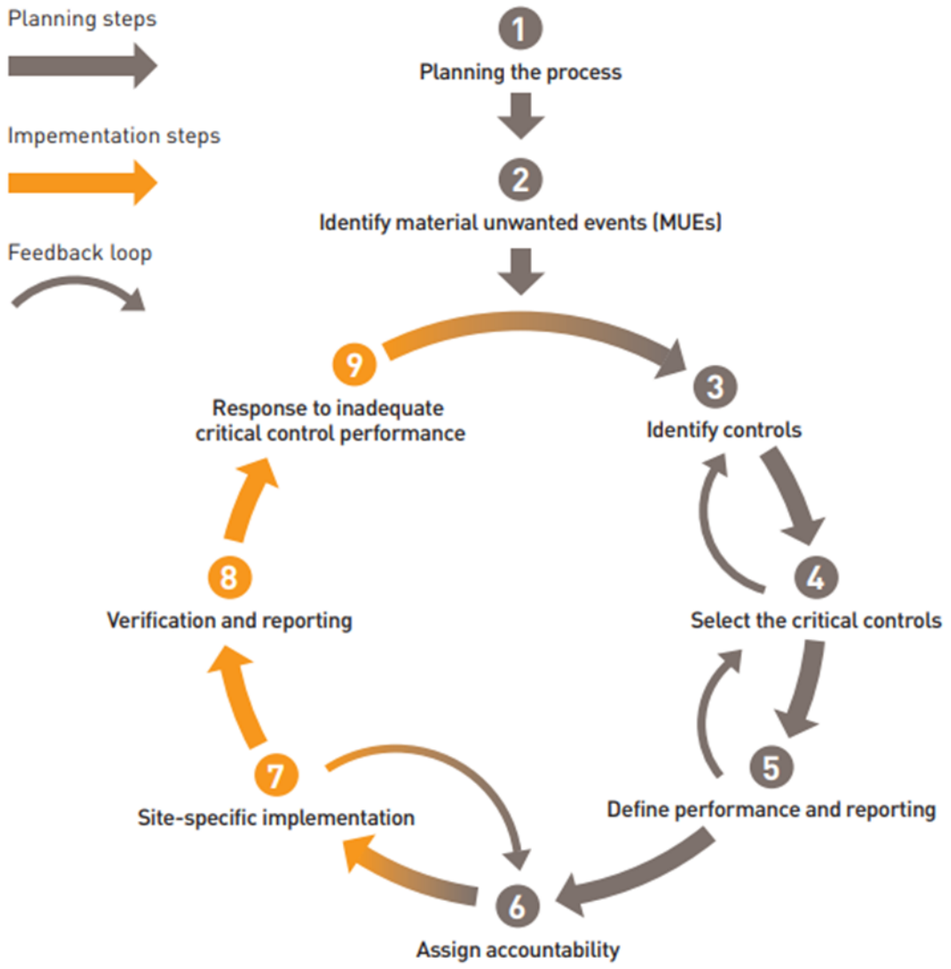
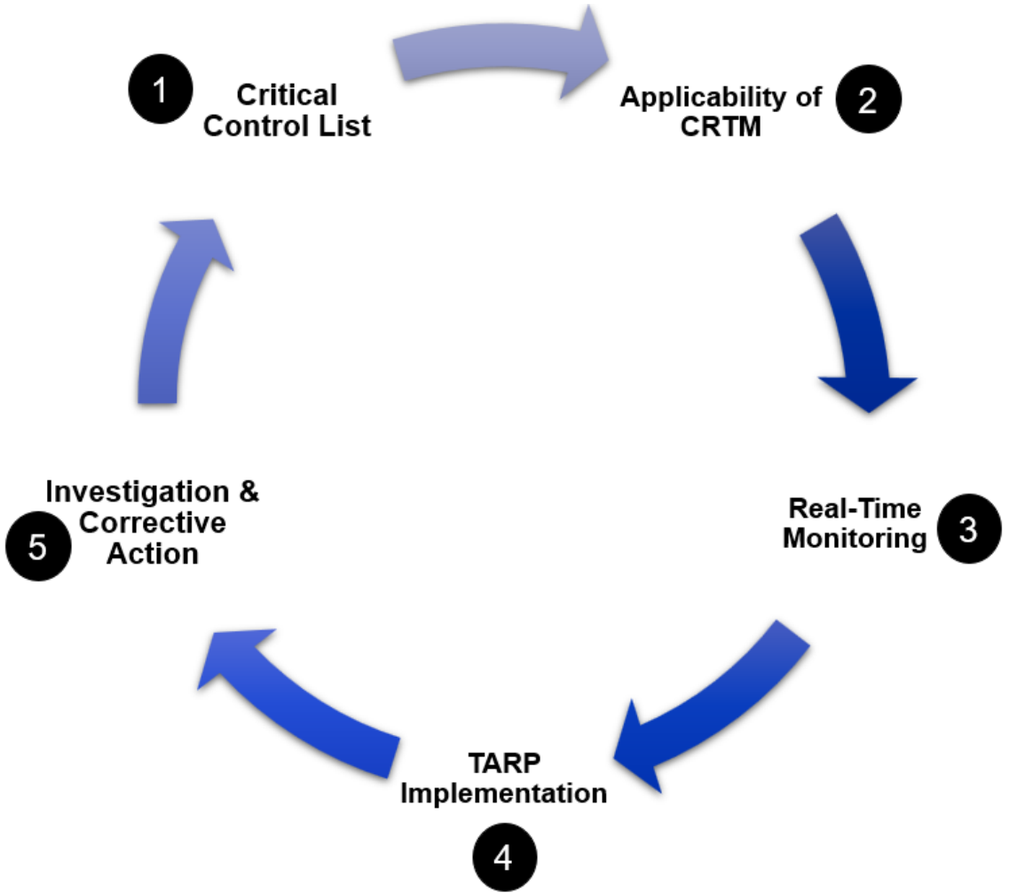
APPLICATION OF CRITICAL CONTROL MANAGEMENT IN CRTM

STEP 1



STEP 2



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CRTM CONSIDERATIONS

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1	2	3	4
			
Noise CRTM Framework	**Trigger Action Response Plans**	**Warning Signals**	**Intervention Signal**

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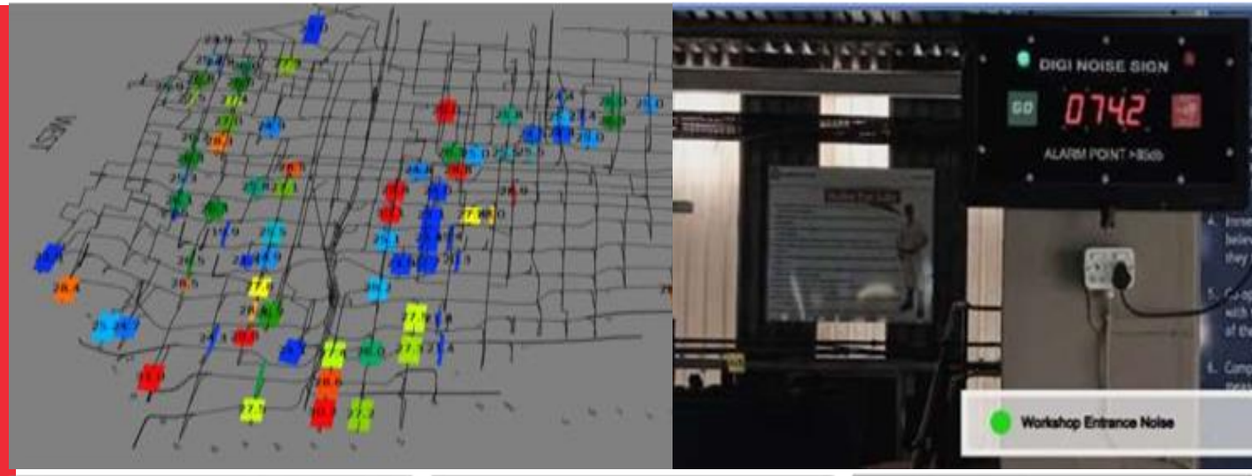
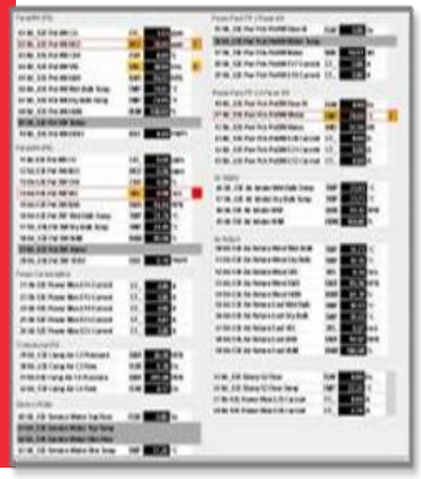
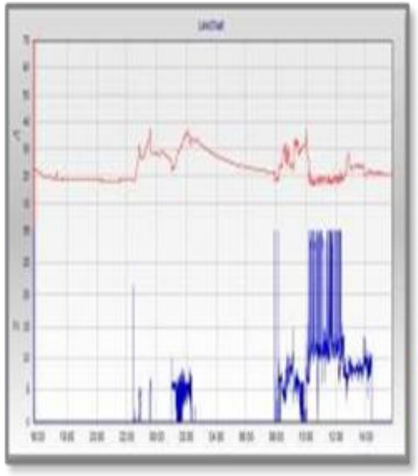
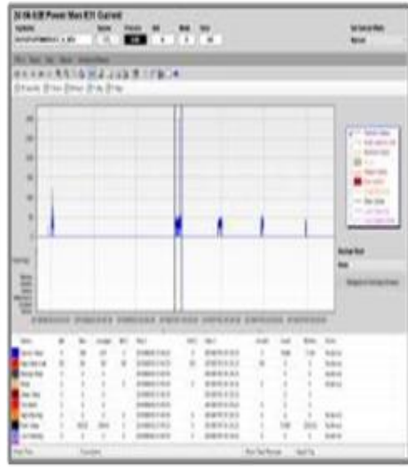
1 NOISE CRTM FRAMEWORK

- CRTM constantly monitors exposures to detect the performance of critical controls.
- Serves as an early indicator of potential exposures and uses data logging to provide exposure profiles.
- Must be linked to the mine's identified electronic communication system and key indicators reported through a Trigger Action Response Plan.









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2 TRIGGER ACTION RESPONSE PLAN

- **The Triggered Action Response Plan (TARP)** consists of a set of documented and known hazards that need to be checked for continuous improvement in the working place.

- The level of risk is also pre-classified and the responsible person carrying out the inspection has to perform according to this plan.

Risk Impact	Trigger	Action	Response
Level 1 Normal Event			
Level 2 Medium Risk Event	Trigger	Action	Response
Level 3 Medium Risk Event	Trigger	Action	Response

3 WARNING SIGNAL

Warning signal – means that whereby the noise level ≥ 85 dB(A) < 104 dB(A), the risk owner of such workplace, should inform the employees and ensure that the required controls have been adhered to.

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4 INTERVENTION SIGNAL

Intervention signal – means that whereby the noise level ≥ 104 dB(A), the risk owner of such workplace should investigate that incident, implement corrective actions to reduce the noise level to below 104 dB(A)

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CRTM APPLICATION REVIEW

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LITERATURE REVIEW OF NOISE CRTM APPLICATION

- The available literature on Noise CRTM is based on the application of Internet of Things (IoT) for noise monitoring and reporting.
- The outputs from the Noise CRTM were as follows:
  - Practical, intuitive, fast access analysis of building noise pollution and trigger alerts in the case of poor acoustic comfort.
  - Graphical display of noise measurements in real-time and use of a warning signal framework to warn people in the area and trigger a reaction from responsible persons.
  - Real-time monitoring of noise which enables visualization of noise levels and the noise sources based on frequency analysis.
  - Noise pollution analysis in smart cities for zoning and strategic planning.

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NOISE CRTM VERIFICATION PROCESS

Step 1

Review of Noise CRTM information gathered from SAMI

Engagement Sessions with operations to define CRTM considerations and requirements

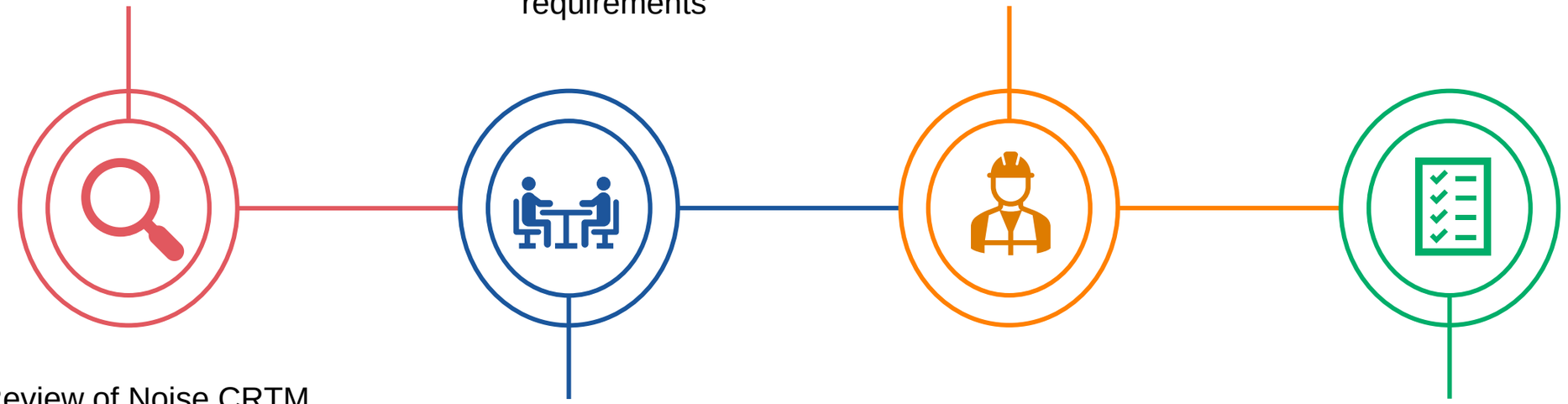
Step 2

Step 3

Conduct Site Verification Visits

Document CRTM Technical Details

Step 4



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CHALLENGES AND OPPORTUNITIES

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CHALLENGES

- Noise Critical Control Identification
- Overreliance on Hearing Protection Devices as a control for noise exposure
- Linkage of Noise CRTM to the mine’s electronic system
- TARP Implementation

OPPORTUNITIES

- Functioning CRTM can be used for Noise Critical Control Management
- The use of an Acoustic Camera to identify critical noise equipment
- Use of the Critical Noise Equipment Screening Tool to guide in Critical Control Identification
- Internalisation of the Industry Noise BowTie
- Use of already existing Risk Management systems to integrate with CRTM

CONCLUSION

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- Literature supports successful application of CRTM in Noise Risk Management
- CRTM can enhance the overall Critical Control Management System
- The application of CRTM in Noise Risk Management enables a proactive response to noise risks.

Thank you

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