

WRITTEN TECHNICAL REPORT

Weighting: 70%

Module: ACMA4039 – Engineering Applications & Study Skills

Assessment: Root Cause Analysis – Technical Report

Student: Milo Montague

Student ID: 2517966

Engagement with Literature Skills (15 marks)

Mark awarded: 14 / 15

Milo showed very strong engagement with relevant academic, professional, and regulatory literature. The report draws effectively on peer-reviewed academic sources (e.g. Aven, Dickson, Wolniak & Grebski), UK legislation, ISO 45001, and the IMechE Code of Conduct. These sources are appropriate, current, and clearly linked to risk management in high-hazard manufacturing environments.

The literature is used well to explain both theoretical and practical aspects of risk management, particularly in relation to explosive atmospheres.

What was done well

- Strong use of peer-reviewed academic literature.
- Clear explanation of risk management theory and its relevance to engineering.
- Appropriate integration of standards and professional guidance.

What could be improved

- Some literature could be synthesised more directly (e.g. comparing authors within the same paragraph).
- A stronger explicit link between literature and the specific RCA case earlier in the report would improve flow.

Suggested enhancement

- Add a short synthesis table comparing *Ishikawa*, *5 Whys*, and *FMEA* in terms of suitability for explosive atmospheres.

Knowledge and Understanding Skills (25 marks)

Mark awarded: 23 / 25

The report demonstrates a very high level of understanding of risk management and RCA principles. Milo clearly explains risk management concepts, cost-risk relationships, and the rationale for prioritising controls in hazardous environments.

The explanation of why detectability remains high for explosive atmospheres, and why severity is predefined, shows strong conceptual understanding of inherent risk.

What was done well

- Clear and accurate explanation of RCA concepts and scoring logic.
- Strong understanding of explosive atmosphere hazards.
- Effective discussion of inherent versus controllable risk.

What could be improved

- Manufacturing process context could be introduced slightly earlier.
- A brief comparison with alternative quantitative tools (e.g. FMEA vs HAZOP) would add breadth.

Suggested enhancement

- Include a system diagram of a typical explosive-risk manufacturing environment showing ignition sources.

Cognitive and Intellectual Skills (20 marks)

Mark awarded: 18 / 20

Milo demonstrated strong analytical reasoning through detailed justification of severity, occurrence, and detection ratings. The explanation of percentage risk reduction (often exceeding 80%) is logical and clearly linked to the effectiveness of controls.

The recognition that detectability cannot realistically be reduced in many explosive scenarios shows mature critical thinking.

What was done well

- Clear and logical justification of scoring decisions.
- Strong evaluation of mitigation effectiveness.
- Appropriate reflection on residual risk.

What could be improved

- Residual risk could be discussed more explicitly in the conclusion.
- Some explanations could be tightened to reduce repetition.

Suggested enhancement

- Add a summary table highlighting the top three risks before and after mitigation with percentage reductions.

Practical Application Skills (20 marks)

Mark awarded: 19 / 20

The RCA application is a major strength of this report. The explosive atmosphere case study is highly relevant, complex, and well handled. The RCA table is detailed and realistic, covering a wide range of ignition and detonation scenarios.

Mitigation strategies are appropriate, technically sound, and clearly linked to risk reduction outcomes.

What was done well

- Excellent real-world, high-risk engineering case study.
- Comprehensive and well-structured RCA table.
- Strong linkage between hazards, controls, and outcomes.

What could be improved

- A short discussion on feasibility, cost, or regulatory approval of structural mitigation would add realism.

Suggested enhancement

- Include an annotated schematic of a building designed for pressure release during explosions.

Transferable Skills for Life & Professional Practice (20 marks)

Mark awarded: 17 / 20

The report is well structured and professionally written. Sections follow a logical order, and figures and appendices are used appropriately. The academic tone is generally strong, though minor spelling and formatting issues slightly reduce polish.

What was done well

- Clear structure aligned with the brief.
- Professional academic writing style.
- Effective use of appendices for detailed RCA data.

What could be improved

- Proofreading to address spelling and formatting inconsistencies.
- Slightly more concise phrasing in some sections.

Suggested enhancement

- Add a final flowchart showing *hazard* → *RCA* → *mitigation* → *residual risk*.

Written Report Mark Summary (70%)

Criterion	Mark
Engagement with Literature	14 / 15
Knowledge & Understanding	23 / 25
Cognitive & Intellectual Skills	18 / 20
Practical Application Skills	19 / 20
Transferable Skills	17 / 20
Total (Written Report)	91 / 100

Weighted Contribution to Module (70%):
63.7 / 70