

WRITTEN TECHNICAL REPORT

Weighting: 70%

Module: ACMA4039 – Engineering Applications & Study Skills

Assessment: Root Cause Analysis – Technical Report

Student: Callum Smith

Student ID: 2515673

Engagement with Literature Skills (15 marks)

Mark awarded: 11 / 15

Callum showed a reasonable engagement with literature relevant to risk management and RCA. The report references a range of sources explaining RCA, FMEA, legal requirements, and professional standards, including the IMechE Code of Conduct and Health and Safety legislation. These sources are appropriate and relevant to the task.

However, the literature is often used in a descriptive way, with limited comparison between sources or deeper discussion of how different authors or studies relate to each other within the context of manufacturing engineering.

What was done well

- Appropriate selection of sources related to RCA, FMEA, and professional responsibility.
- Inclusion of legal and ethical considerations required by the brief.
- Referencing generally follows Harvard style.

What could be improved

- Greater use of peer-reviewed academic journals would strengthen academic depth.
- More synthesis between sources (rather than presenting them individually) would improve critical engagement.

Suggested enhancement

- Add a comparison table summarising key RCA tools (FMEA, 5 Whys, Fishbone), outlining when each is most effective and their limitations.

Knowledge and Understanding Skills (25 marks)

Mark awarded: 20 / 25

The report demonstrates a good understanding of risk management and RCA principles within an engineering context. Callum clearly explains what a CMM is, why it is critical to manufacturing accuracy, and how faults in the Z-axis can affect quality and productivity.

The explanation of FMEA, including Severity, Occurrence, Detection, and RPN calculation, shows sound understanding of the methodology.

What was done well

- Clear explanation of the engineering system and fault being analysed.
- Accurate description of RCA and FMEA processes.
- Appropriate linkage between equipment failure, quality impact, and operational efficiency.

What could be improved

- Some explanations are broad and could be more specific to manufacturing practice.
- More explicit discussion of how RCA supports long-term reliability and decision-making would add depth.

Suggested enhancement

- Include a simple system diagram of the CMM highlighting the Z-axis and where the fault occurs.

Cognitive and Intellectual Skills (20 marks)

Mark awarded: 15 / 20

Callum showed reasonable analytical thinking when justifying the Severity, Occurrence, and Detection scores. The explanation for the initial RPN of 72 is logical and clearly linked to machine downtime and measurement inaccuracies.

The reduction of RPN following corrective actions is explained, although the reasoning behind some revised scores could be explored in more depth.

What was done well

- Logical explanation of how rankings were chosen.
- Clear link between corrective actions and reduced risk.
- Consideration of residual risks and ongoing monitoring.

What could be improved

- More detailed justification of revised scores would strengthen evaluation.
- Quantitative comparison of pre- and post-mitigation risk could be clearer.

Suggested enhancement

- Add a before-and-after bar chart comparing Severity, Occurrence, Detection, and RPN values.

Practical Application Skills (20 marks)

Mark awarded: 16 / 20

The application of RCA to a CMM fault is appropriate and relevant to manufacturing engineering. The proposed corrective actions, such as increased calibration frequency, cleaning guide rails, and performance testing, are realistic and technically sound.

However, the application would be stronger with more direct use of operational data or maintenance records to support decisions.

What was done well

- Relevant and realistic engineering case study.
- Practical corrective actions aligned with the identified fault.
- Clear focus on prevention and reliability improvement.

What could be improved

- Greater use of real data (e.g. calibration intervals, error trends) would strengthen application.
- Detection controls could be expanded further.

Suggested enhancement

- Include a maintenance schedule table showing calibration frequency before and after corrective action.

Transferable Skills for Life & Professional Practice (20 marks)

Mark awarded: 16 / 20

The report follows a clear structure aligned with the brief and is generally written in a professional tone. Sections are logically ordered, and the overall flow from introduction to conclusion is coherent.

Some language inaccuracies and repetition slightly affect clarity and conciseness.

What was done well

- Clear structure following the required format.
- Appropriate technical language for an engineering audience.
- Logical progression through the RCA process.

What could be improved

- Proofreading would improve clarity and grammatical accuracy.
- More concise phrasing would strengthen professional presentation.

Suggested enhancement

- Add a summary flowchart in the conclusion showing *fault* → *RCA* → *corrective action* → *outcome*.

Written Report Mark Summary (70%)

Criterion	Mark
Engagement with Literature	11 / 15
Knowledge & Understanding	20 / 25
Cognitive & Intellectual Skills	15 / 20
Practical Application Skills	16 / 20
Transferable Skills	16 / 20
Total (Written Report)	78 / 100

Weighted Contribution to Module (70%):
54.6 / 70