MEC-E6004 Materials Safety

Attached, you'll find a failure analysis report. Read through the text and anlyze the failure. In your answer, describe which material deformation and failure mechanisms are present and assess the chain-of-events which led to the failure.

In grading, the following points will be taken into account: description and analysis of the main failure mechanism, ruling out other potential mechanisms and justifying why those mechanisms are not significant for the present case.

In your answer, you may use the list of questions below to guide you. The weight of different sections in grading is indicated in percentages. The exam will be graded on a scale from 0 to 5.

A. Description of investigation methods applied (10%)

- What means of investigation were used in the failure analysis?
- What computational methods were used?
- What material or results were obtained

B. The primary cause of the failure and description of the main failure mechanism (30%)

- What is the primary cause of the failure (provide reasoning)?
- What's the chain of events leading to the failure?

C. Ruling out alternate failure mechanisms (30%)

- Can plastic deformation be ruled out as a failure mechanism? How?
- Can creep be ruled out? How?
- Can brittle fracture be ruled out? How?
- Can fatigue be ruled out? How?
- Can environmentally assisted failure be ruled out? How?

D. Recommendations to prevent similar failures in the future (30%)

- How should the design, material, use or other factors be developed to prevent similar failures in the future. Provide several alternatives and indicate most promising.

eddy currents/ penetrant die

Remerber to justify your reasoning and conclusions!