

Engineering Ethics: When Buildings Fail

Overview, Background Resources and Materials Needed

Name: _____	Class: _____	Date: _____
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TASK 1: CASE STUDY SUMMARIES

Read both summaries carefully. Use a highlighter to mark: (a) materials used, (b) how fire spread, (c) failures and cost-cutting.

GRENFELL TOWER (LONDON, 14 JUNE 2017)	WANG FUK COURT (TAI PO, HK, 26 NOV 2025)
<p>The Building: A 24-storey social housing tower in North Kensington, London, built in 1974. In 2012–16, ACM (Aluminium Composite Material) cladding panels with a polyethylene (PE) core were fitted to the exterior. Polyurethane foam insulation was installed behind the cladding, with an air cavity between them.</p> <p>The Fire: At 00:54, a faulty fridge-freezer in a 4th-floor flat caught fire. Flames escaped through a window and ignited the ACM cladding. The air cavity behind the cladding created a 'chimney effect', pulling flames upward. The fire reached the roof in ~30 minutes. 72 people were killed.</p> <p>Key Failures:</p> <ul style="list-style-type: none"> • PE-core cladding was highly flammable – cheaper option saved £293,368 • Manufacturers falsified/manipulated safety test data • Building control approved non-compliant cladding • Total failure of compartmentation; fire doors lacked self-closers • No sprinkler system; single staircase; no evacuation plan • 'Stay put' advice maintained too long • Residents warned of 40+ safety issues in 2016 – ignored • Inquiry: 'decades of failure by government and industry' 	<p>The Building: Eight 31-storey residential towers in Tai Po, Hong Kong, built in 1983. ~4,600 residents, nearly 40% aged 65+. From 2024, all towers were undergoing facade renovation: bamboo scaffolding, green protective netting, and expanded polystyrene (EPS) foam boards over windows.</p> <p>The Fire: At 14:51, scaffolding netting on a lower floor caught fire. Flames spread to EPS foam boards, which ignited rapidly and blew out window glass, letting fire enter apartments. The scaffolding/netting/foam created a continuous vertical fuel path ('chimney effect'). Strong winds carried embers between towers (only 7.5m apart). 7 of 8 towers engulfed. 168 people killed. Fire burned for 43+ hours.</p> <p>Key Failures:</p> <ul style="list-style-type: none"> • 2,300 rolls of non-compliant netting (HK\$54 vs HK\$100 for compliant) • After typhoon damage, cheap netting installed; compliant netting placed only at base (where inspectors sampled) • EPS foam boards over windows – highly flammable accelerant • Fire alarms non-functional; suspected of being deactivated • Residents demonstrated foam flammability in Sept 2024 – dismissed • 16 inspections over 16 months failed to prevent disaster • Falsified safety certificates for netting • 16 arrested on charges incl. manslaughter and corruption

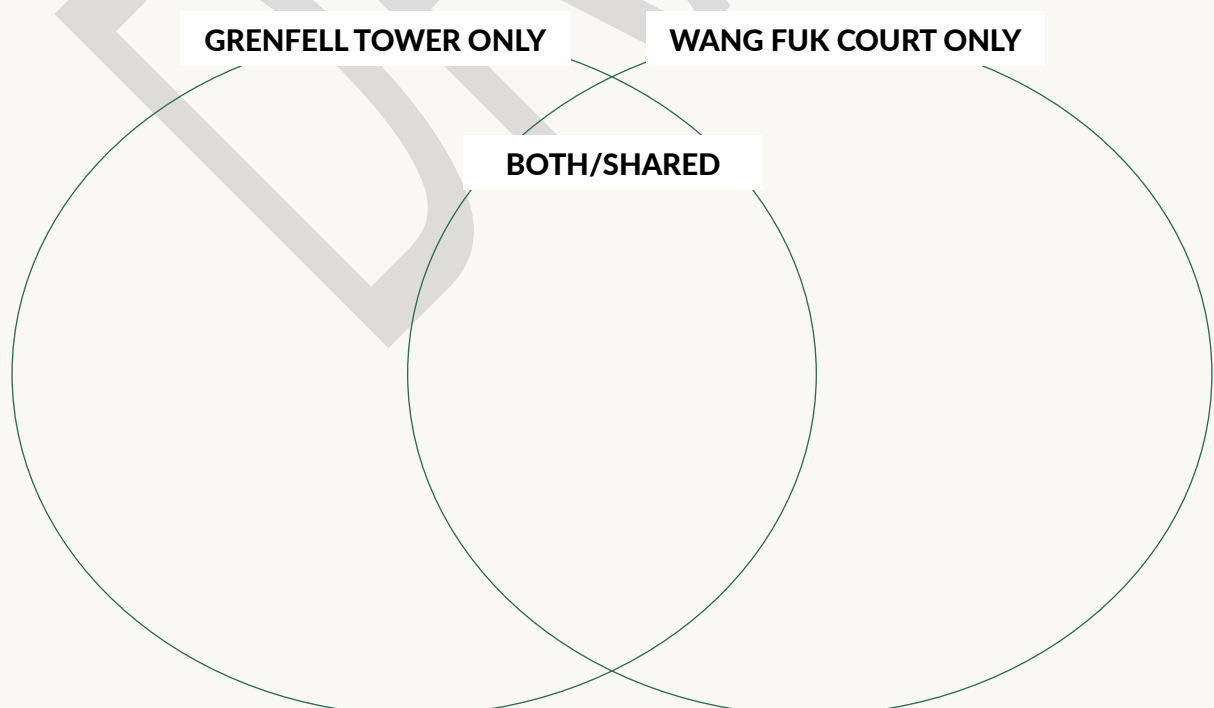
TASK 2: COMPARISON TABLE

Complete the table below using the case studies on page 1 and the information from the presentation slides.

FACTOR	GRENFELL TOWER	WANG FUK COURT
What flammable material was applied to the exterior?		
How did the fire spread upward so quickly?		
How did the fire enter the apartments?		
What cost-cutting decisions were made?		
What warnings were ignored before the fire?		
How did regulations or inspections fail?		
What evacuation problems occurred?		

TASK 3: SIMILARITIES AND DIFFERENCES

In the space below, draw a Venn diagram with two overlapping circles. Label the left circle 'Grenfell Tower' and the right circle 'Wang Fuk Court'. Write factors unique to each fire in the outer sections, and shared factors in the overlapping centre. Aim for at least 3 points in each section.



TASK 4: EVALUATIVE WRITING

KEY QUESTION: What do the Grenfell Tower and Wang Fuk Court fires tell us about the ethical responsibilities of engineers, designers, manufacturers, and regulators when making decisions about building materials and safety?

Write 6–8 sentences answering the key question above. Use evidence from BOTH case studies. Try to use the sentence starters and connectives below to structure your response.

Sentence starters and connectives:

- Both the Grenfell Tower and Wang Fuk Court fires demonstrate that...
- A key similarity between the two cases is...
- In the case of Grenfell Tower... Similarly, at Wang Fuk Court...
- This shows that engineers have a duty of care to...
- One ethical issue highlighted by both fires is...
- If manufacturers had not... then...
- The most significant lesson for designers and engineers is...
- In my own design practice, I should...

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