

Ethics in Engineering & Technology



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Outlines of Talk

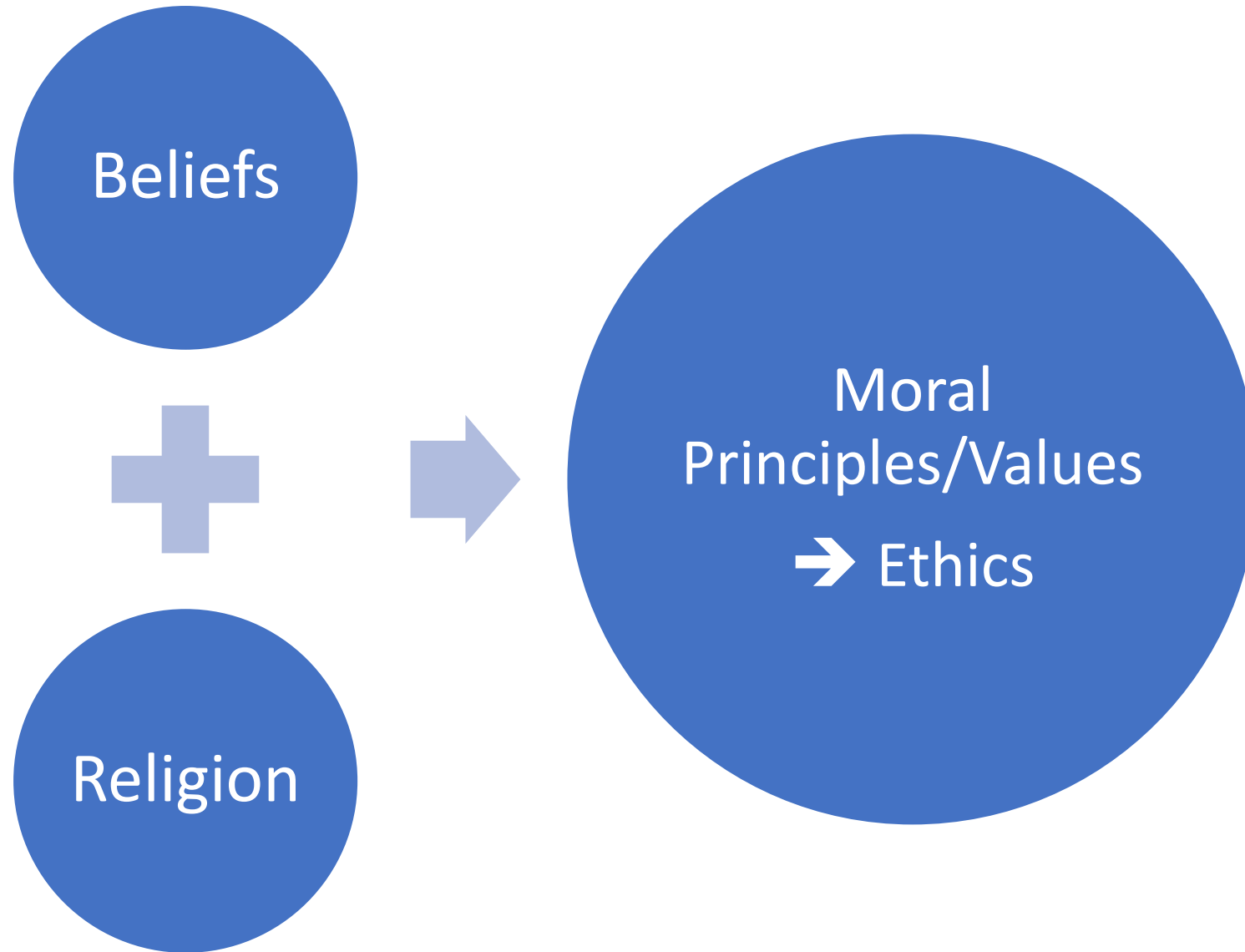
(45 Minutes plus 15 mins for Q/A)

- 1. What is Ethics?
- 2. What is Engineering Ethics?
- 3. Ethics: The Fundamentals
- 4. Codes of Ethics
- 5. Lessons from Some Engineering Cases/Collapses
- 6. Q & A

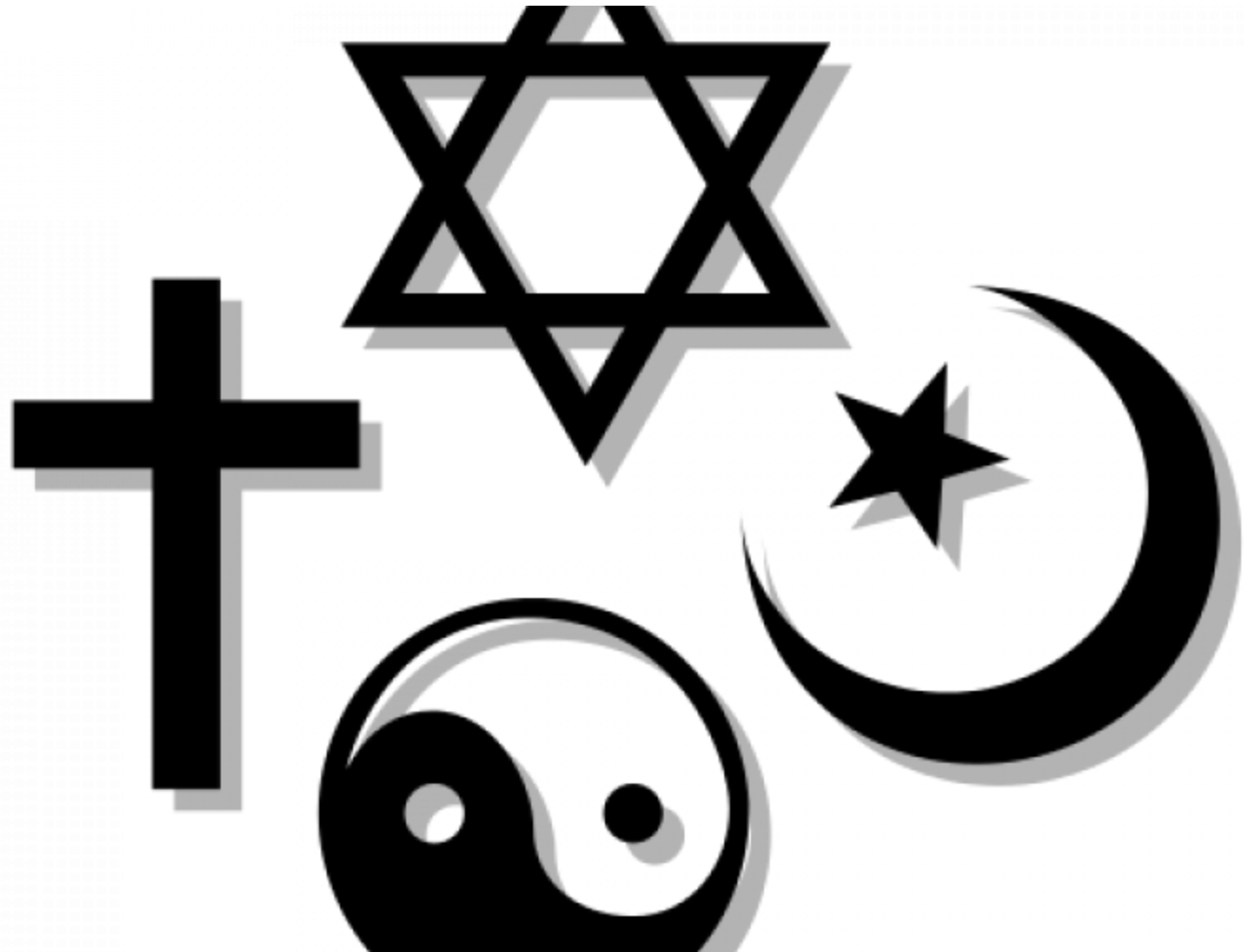
1. What's Ethics?

Ethics or moral philosophy is a branch of philosophy that "involves systematizing, defending, and recommending concepts of right and wrong behavior".

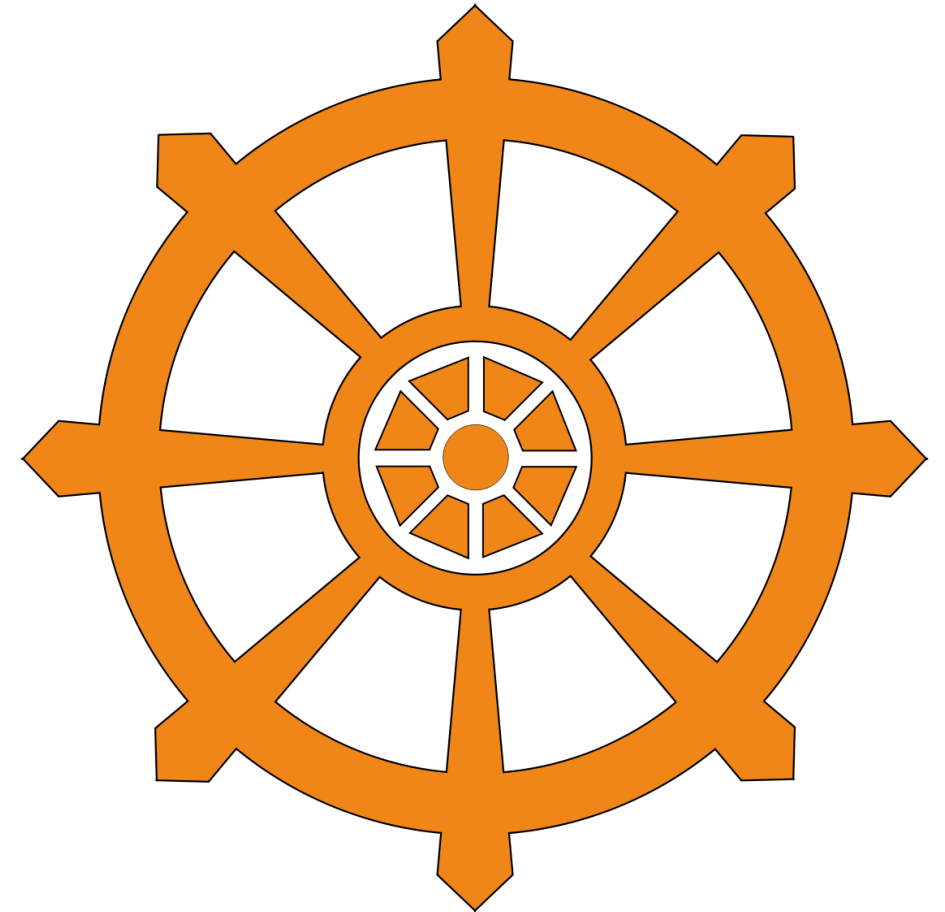
Applied ethics, concerning what a person is obligated (or permitted) to do in a specific situation or a particular domain of action.



Religion



Religion





Lao Tzu (Laozi (;[Chinese](#): 老子; commonly translated as "Old Master") and **Lao-Tze** was an ancient [Chinese philosopher](#) (4th – 5th Century BCE) and writer. He is the reputed author of the [Tao Te Ching](#),^[7] the founder of philosophical [Taoism](#), and a [deity](#) in religious [Taoism](#) and [traditional Chinese religions](#).



Confucius ([Chinese](#): [孔夫子](#); 551–479 [BCE](#)) was a [Chinese philosopher](#) and politician of the [Spring and Autumn period](#) who was traditionally considered the paragon of Chinese sages. Widely considered one of the most important and influential individuals in [human history](#), Confucius's teachings and philosophy formed the basis of East Asian culture and society, and continue to remain influential across China and East Asia today

Belief in Papua New Guinea (PNG)



Papua New Guinea is one of the most culturally diverse countries in the world. As of 2019, it is also the **most rural**, as only 13.25% of its people live in urban centres. There are **851** known [languages in the country](#), of which 11 now have no known speakers.

2. What is Engineering Ethics?

Engineering ethics is the field of system of moral principles that apply to the practice of engineering. The field examines and sets the obligations by engineers to society, to their clients, and to the profession.

As a scholarly discipline, it is closely related to subjects such as the philosophy of science, the philosophy of engineering, and the ethics of technology.

Ethics of technology is a sub-field of ethics addressing the ethical questions specific to the Technology Age, the transitional shift in society where personal computers and subsequent devices have been introduced to provide users an easy and quick way to transfer information.

Issues in Techno-ethics:

1. Copyrights.
2. Cybercriminality.
3. Privacy vs Security.
4. Genetically Modified Organisms (GMO/GMF).
5. Artificial Intelligence (AI).

Genetically Manipulated Crops





3. Ethics:

The Fundamentals

Right vs Wrong

Good vs Evil

Fair & Justice

Honesty

- **Sharing (1)**
- **PR Report**

Health & Safety

Confidentiality

- Data

Conflict of Interests

- Employee vs Employer

Corruption

- PNG, China

4. Codes of Ethics

Sources of Codes of Ethics..

Professional Bodies:

UK: ICE; IET; IMechE

USA: ASCE: NSPE

Legal Requirements: PE Act in Singapore.



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Institution of Civil Engineers

SIET



Institution of
**MECHANICAL
ENGINEERS**





Champion | Guide | Advance | Unite



ASCE – Code of Ethics

(8 General Principles)

1. Engineers shall hold paramount the **safety, health and welfare** of the public and shall strive to comply with the principles of sustainable development in the performance of their professional duties.
2. Engineers shall perform services only in areas of their **competence**.
3. Engineers shall issue public statements only in an objective and truthful manner.
4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.
5. Engineers shall build their professional reputation on the merit of their services and **shall not compete unfairly** with others.

6. Engineers shall act in such a manner as to uphold and enhance the **honor, integrity, and dignity of the engineering profession** and shall act with zero-tolerance for bribery, fraud, and corruption.
7. Engineers shall continue their **professional development** throughout their careers, and shall provide opportunities for the professional development of those engineers under their supervision.
8. Engineers shall, in all matters related to their profession, treat all persons fairly and encourage equitable participation without regard to gender or gender identity, race, national origin, ethnicity, religion, age, sexual orientation, disability, political affiliation, or family, marital, or economic status.[\[24\]](#)



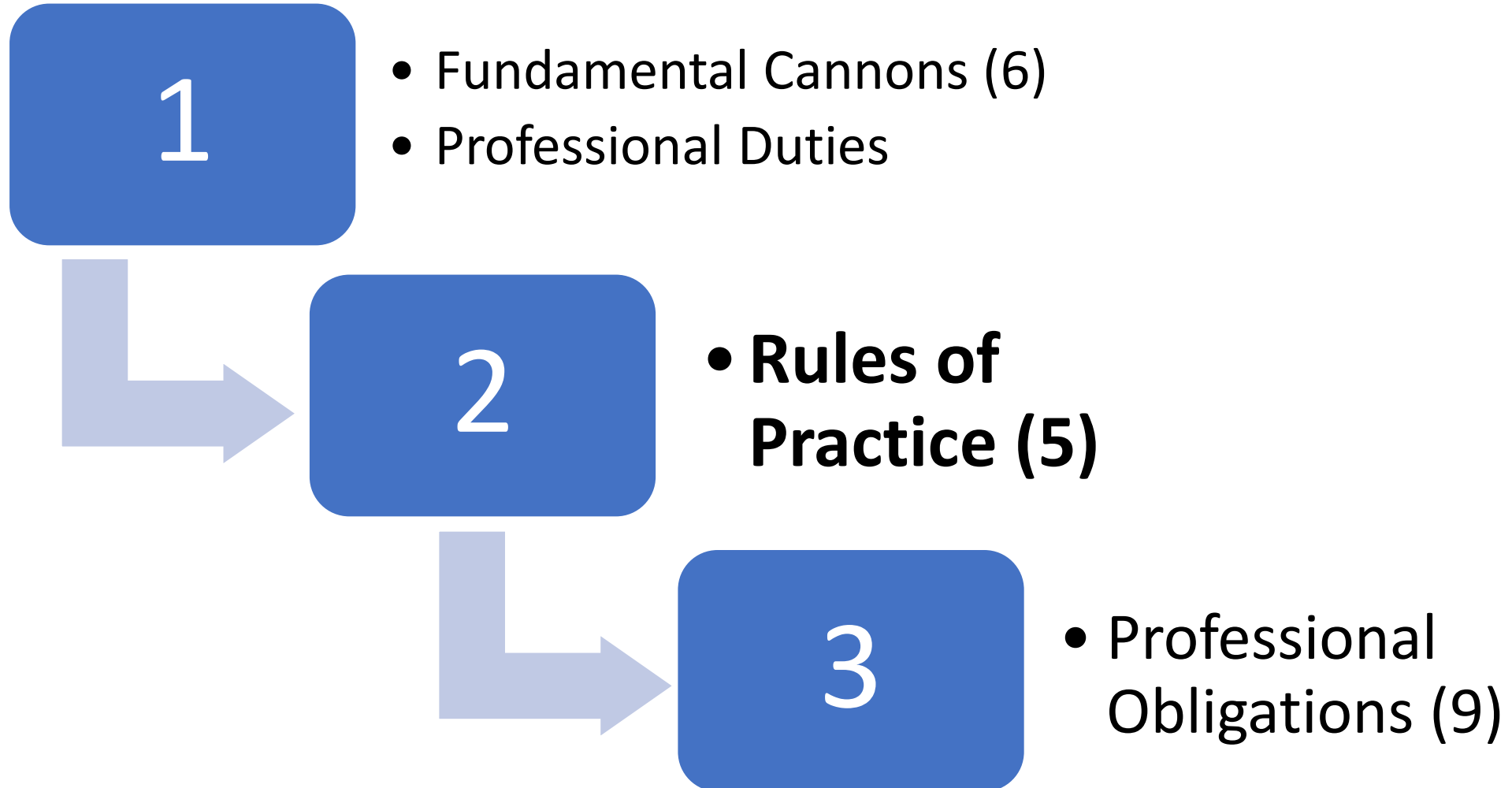
NSPE

- Code of Ethics



NATIONAL SOCIETY OF
PROFESSIONAL ENGINEERS

NSPE – Code of Ethics (2019)



NSPE – Rules of Practice (5)

- 1 Engineers shall hold paramount the **safety, health, and welfare** of the **public**.
- 2 Engineers shall perform services only in the areas of their **competence**.
- 3 Engineers shall issue public statements only in an **objective** and **truthful** manner.
- 4 Engineers shall act for each employer or client as **faithful agents** or trustees.
- 5 Engineers **shall avoid deceptive acts**.

5. Lessons from Cases/Collapses

Singapore:

1. Hotel New World Collapse (1986)
2. Nicoll Highway Collapse (2004)

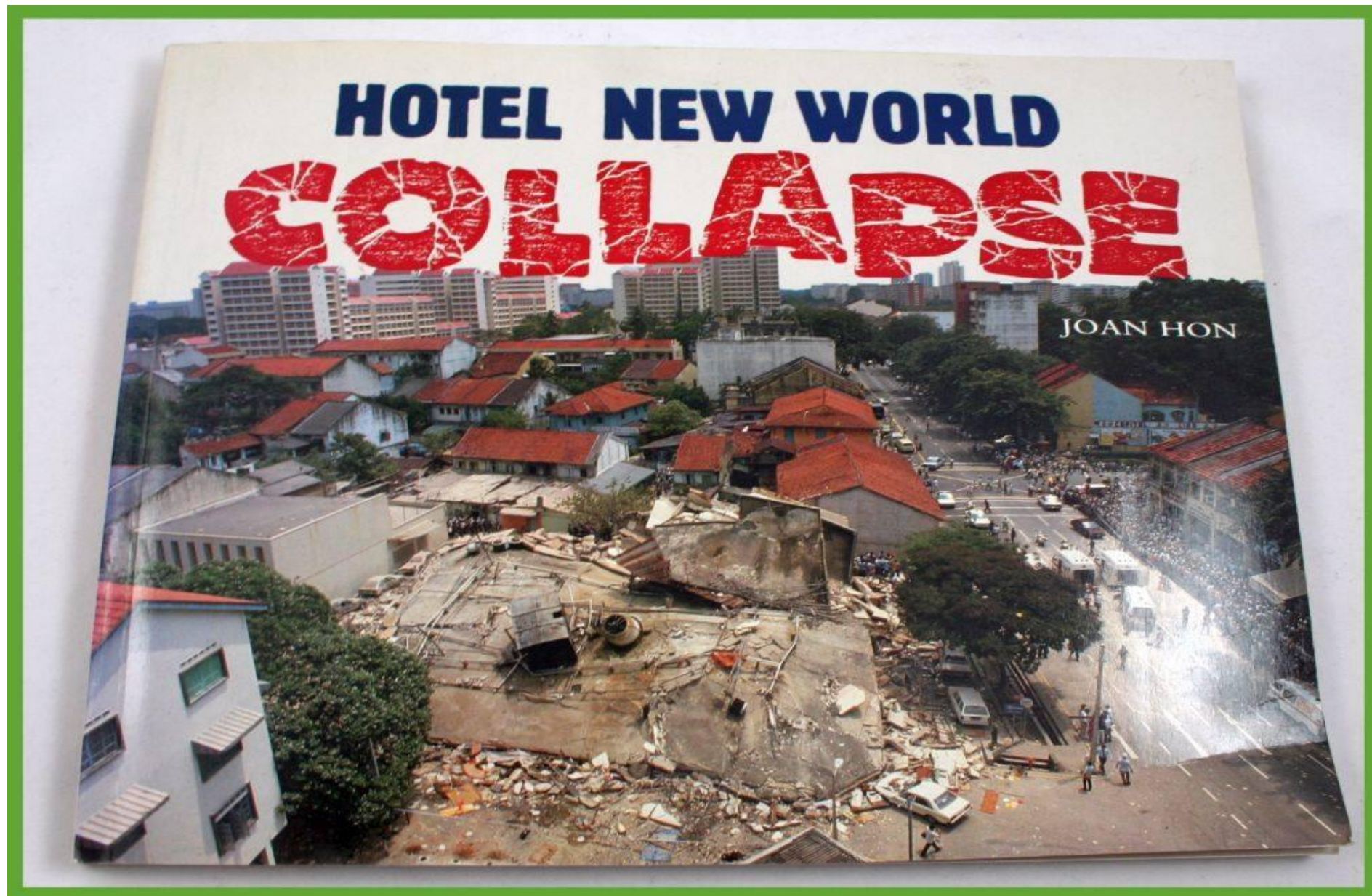
Other Countries

1. The Highland Towers Collapse in Malaysia (1993)
2. Hyatt Regency Walkway Collapse, USA. (1981)

Some Cases/Collapses

No	Event	No of Deaths
1	Hotel New World Collapse	33 killed (17 injured)
2	Nicoll Highway Collapse	4 killed (3 injured)
3	Highland Towers Collapse	48 killed
4	Hyatt Regency Walkway Collapse	114 killed (216 injured)

Hotel New World Collapse (Singapore)





Untrained man drew the plans



MR LEONG ... confessed he signed a number of bogus letters on tenders.

THE inquiry into the Hotel New World disaster learnt yesterday that the man who drew the architect's plans for the building was an unqualified draughtsman.

The commissioners investigating the building collapse on March 15, which left 33 people dead, also heard charges of shoddy workmanship.

The two main witnesses of the day both pointed a finger at Mr Ng Khong Lim, managing director of building owners Lian Yak Realty. He was among those who died in the disaster.

Architect's draughtsman Leong Shui Lung said he had no formal draughtsman's qualifications and confessed that he signed a number of bogus letters which were prepared to make it appear that tenders for the construction of the building were called.

But he claimed it was Mr Ng who asked him to sign the letters, which were tendered to

the commission on Tuesday. The letters had been found in a safe in Mr Ng's home after his death.

Some of the letters were written on stationery of the "Pan Singapore Group Architect and Engineer" and were apparently an exchange between the building's architects and various contractors over tender bids.

But Mr Leong told the inquiry

• More reports on Pages 10 and 11

that "Pan Singapore" did not exist and Mr Ng had told him so.

He said the whole charade — which he acknowledged was illegal — was meant to convince Mr Ng's partners that he had called for tenders.

Mr Leong said he drew all the site and building plans for the Lian Yak Building, which housed the New World Hotel, in Serangoon Road.

He said he recommended an architect to Mr Ng and received half of the \$20,000 architect's fees. He visited the site

on behalf of the architect two or three times a week while work went on.

On site, Mr Leong said, he noticed frequent changes in sub-contractors because "Ng Khong Lim was in the habit of using abusive words on workers". Mr Ng was also slow to pay the workers and sometimes underpaid them.

On another point, he said that there should not have

been a water tank in the middle of the flat roof of the building.

When he learnt that a water tank was being built on the rooftop, he said he told Mr Ng that the plans only provided for one in the building's motor room.

But Mr Ng replied that he would shoulder the responsibility for that, Mr Leong said. Then he told the architect, Mr Ee Hoong Khoon, but Mr Ee "didn't say anything".

The other key witness yes-

terday was engineer's draughtsman Shum Cheong Heng, who said two tests normally carried out on building sites were not done for the Lian Yak Building because Mr Ng refused to pay for them.

No test was done to check the soil conditions at the site. Nor was any load test done to check the weight the piles could bear.

There was also no qualified person to supervise the work on site, because Mr Ng would not pay for a clerk-of-works who would have ensured that all work was done according to the architect's and engineer's specifications.

Mr Shum said he visited the site several times and found signs of shoddy construction work. The site was also ill-equipped to ensure that work was done properly.

He said he complained to Mr Ng about all these things, but Mr Ng was "a very arrogant man" and would not follow instructions.

Mr Shum will continue his testimony today.

An article in *The Straits Times* outlining the main findings on the causes of the Hotel New World collapse from the Commission of Inquiry (1986).

Article reprinted with permission from
Singapore Press Holdings

Nicoll Highway Collapse (Singapore)



The Nicoll Highway Collapse

**D. W. Hight
T.O. Henderson + A.R. Pickles
S. Marchand**



LATEST: MRT site behind Golden Mile caves in

in India

Golkar meets to pick presidential c

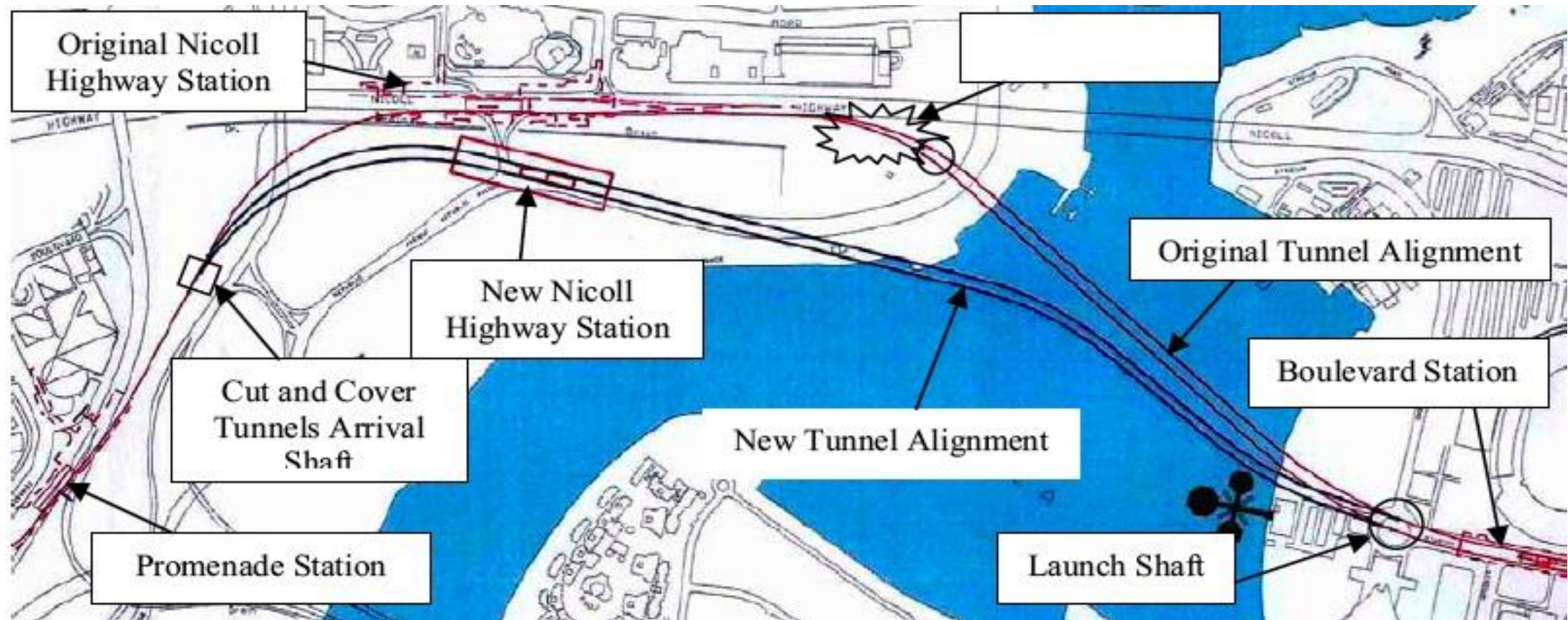
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Sam Man Keong-Talk - SIET-IQY - 11 December 2021

Highland Towers Collapse (Malaysia)

The Highland Towers Collapse

Ghosts and Hauntings



On 11 December, 1993, Block 1 of the Highland Towers apartments in Malaysia collapsed after ten days of rain and flooding caused a landslide. 48 people lost their lives, but it is said not all rest in peace, as their spirits have been seen about the ruins in the jungle that now reclaims the land.

For more ghosts and hauntings check out The Paranormal Guide!

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Sam Man Keong-Talk - SIET-IQY - 11 December 2021

Lawsuits:

Residents vs Developers ...Local Council

Court: Local councils cannot be held liable



Justice Abdul Hamid:
'Projects will stall. The local
council may go bust'

> FROM PAGE 1

The court was unanimous in allowing the MPAJ's appeal to set aside the Court of Appeal's decision holding the MPAJ 15% responsible for the pre-collapse period.

As for the post-collapse liability, it dismissed with a 2-1 majority the cross-appeal by the 73 residents of Block Two and Three against the Court of Appeal's ruling that the MPAJ was not liable for losses suffered during the post-collapse period. Justice Shim gave a dissenting judgment.

Justice Abdul Hamid Mohamad said that if the local councils were made liable, it would open the floodgates to further claims for economic loss, and this would deplete the council's resources meant for the provision of basic services and infrastructure.

"Projects will stall. The local council may go bust. Even if it does not, is it fair, just and reasonable that taxpayers' money be utilised to pay the 'debts' of such people?"

"In my view, the answer is



TERRIBLE DISASTER: The two collapsed blocks of the Highland Towers condominium is shown in this file photograph taken on Dec 11, 1993.

no," he said.

In overturning the trial judge's decision to allow the post-collapse claims, Justice Abdul Hamid said vandalism followed every disaster, natural or otherwise, in undeveloped, developing or developed countries.

"Recent events showed that even the most-powerful military and the best-equipped police force in the richest and most-developed country in the world were unable to prevent it," he said.

"In my view, the provision of basic necessities for the general

public has priority over compensation for pure economic loss of some individuals, who are clearly better off than the majority of the residents in the local council area," he said.

He said a local council has an endless list of duties to perform for its residents and relied mainly on assessment rates and fees for licences.

Justice Arifin concurred with Justice Abdul Hamid's findings.

In his dissenting judgment on the post-collapse liability, Justice Shim said the MPAJ could not seek shelter in Section

95(2) of the Street, Drainage and Building Act because this was a case of negligence in failing to formulate and implement the master drainage plan so as to ensure the stability and safety of the adjacent Blocks Two and Three.

He said there was an assumption of responsibility by the MPAJ to do what it had promised.

"I do not think it would be in the public interest that a local authority such as the MPAJ should be allowed to disclaim liability for negligence commit-

ted beyond the expansive shelter of Section 95(2) or other relevant provisions of the Act nor would it be fair, just and reasonable to deprive the respondents of their rightful claims under the law," he said.

In 2000, High Court Judge James Foong ruled for the 73, and apportioned liability as follows: Arab-Malaysian 30%, Metroflux and MBF Property Services together 20%, Highland Properties 15%, MPAJ 15%, draughtsman Wong Ting San 10% and engineer Wong Yuen Kean 10%.

Hyatt Regency Walway Collapse (USA)



HYATT REGENCY WALKWAY COLLAPSE

KANSAS CITY





Chicago Tribune

Saturday, July 18, 1981

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Horror in KC hotel



A woman watches in horror as rescue workers search for survivors in the debris of two walkways that collapsed onto a lobby crowded with people at a Kansas City, Mo., hotel [right] Friday night. More photos on page 3.



47 die, 100 hurt as walkways collapse

From Tribune wire services

KANSAS CITY, Mo.—Two of three concrete walkways inside an enclosed courtyard at the Hyatt Regency Hotel here collapsed onto a lobby floor full of dancers Friday night, killing at least 47 people and injuring more than 100.

Police said 42 people were taken to area hospitals by ambulance, and many more were transported to hospitals by helicopters, taxis, private cars, and buses. They said 45 were killed at the scene and 4 died in hospitals.

Police Chief Norman Caron told reporters more deaths were expected and estimated that 150 people were injured. More than 700 firemen and police be-

gan what promised to be a night-long rescue effort, hampered by the weight of the debris.

AS THE FIRST BODIES were pulled from a tangle of twisted girders and broken glass, officials designated a ground-floor exhibition area a temporary morgue, where a priest administered last

rites. When the walkways collapsed at 7:30 p.m., the floor beneath was crowded with people at a "tea dance" that featured big band music, an event that had become a Friday night fixture at the 40-story, year-old hotel. It had begun at 5 p.m. and was in full progress at 7 p.m.

One policeman said he could see "arms and legs sticking out all over" from under the debris as rescuers brought bodies out. Police said at least seven people were still trapped hours after the collapse. Officials decided to rip out the metal frames of plate glass windows in front of the lobby so they could use cranes inside the building.

OFFICIALS SAID rescuers were using cutting torches and electric saws to clear tons of debris in the hotel's lobby but would be unable to get to those still trapped without the cranes.

The walkways, made of concrete and reinforced with steel and partly supported by cables suspended from the ceiling, were stacked one over another inside the lobby of the hotel, which is five stories high.

One walkway fell and knocked down another that crossed the lobby beneath it. A third walkway near the two that collapsed was undamaged.

The upper walkway fell several stories, but there was no indication what caused

it to give.

An hour after the collapse, firemen detected a gas leak but quickly sealed it off. Electricity was also knocked out on the lower floors of the hotel, and guests were asked to begin leaving the hotel.

Many were moved across the street to the Crown Center Hotel.


ALTHOUGH DEBRIS filled the lobby, most of the wreckage fell on people who were on the periphery of the dancing, some standing beside lobby bars and others sitting at small tables.

"It may take several weeks to deter-

Continued on page 2, col. 2

Page 3

People 'just flew all over'



Two vertically touching walkways collapsed onto a dance competition being held in the hotel's lobby. The collapsing walkways killed 114 and injured 216 people.

The Disaster

- /// On July 17th 1981 about 2000 people were in the lobby watching a dance competition.
- /// Dozens of people were packed into the overhead walkways.
- /// During the initial building phase a subtle design change changed 1 support beam that would have helped in supporting the walkways to 2 support beams that did not have proper construction.







*Thank
you*



Questions