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Lessons Learned in Compliance to the Fire Safety Regulation of Tuition Centres for a Safe Learning Environment

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Abstract
Fire safety has become a major concern due to recent incidents in educational buildings, which pose significant risks to human life. With the growing demand for personalized learning, ensuring fire safety in tuition centres located in shop offices is essential for creating safe and supportive learning environments. Compliance with fire safety regulations under the Private Educational Institutions framework is mandatory and requires approval from the Fire and Rescue Department of Malaysia (FRDM). This study uses a qualitative approach to review past fire incidents and gather expert insights, revealing critical compliance gaps and calling for stricter enforcement and clearer guidelines.

Keywords: Lessons Learned; Fire Safety; Tuition Centre; Safe Learning Environment

DOI: https://doi.org/10.21834/e-bpj.v10i32.6772

1.0 Introduction

Fire safety in educational buildings is vital to protect students, staff, and visitors in highly populated learning spaces where there is a need for prompt and orderly evacuation. According to Yaman (2025), fires in educational buildings can lead to significant loss of life and property and harm students' emotional and psychological well-being. To protect lives and support healthy development, reducing fire risks and ensuring safe learning environments is essential. As such, premises need to be controlled according to fire safety regulations, i.e., effective means of escape, provision of alarm, and building construction resistant to fire, as per the Uniform Building By-Laws 1984 (UBBL) (Ministry of Housing and Local Government, 1984). Through complying the fire safety requirement enforced by the Fire and Rescue Department of Malaysia (FRDM) under the Fire Services Act 1988 (Act 341), it ensures that such safety features are properly maintained in line with the mandatory fire certification (FRDM, 2023). Hence, the spatial layout should accommodate educational needs and fulfil educational facilities' purpose by providing a variety of spaces to support teaching in both theoretical and practical sciences. (Ariani and Mirdad, 2016; López-Chao et al.,2017). This involves spatial quality, natural lighting,

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and adaptable layouts influencing learning performance and well-being. Therefore, the physical condition of the tuition centre building, specifically, should offer zero fire hazards while maintaining the basic needs of education facilities in creating better learning place.

1.1 Overview of Tuition Centre as Informal Education System

Tuition centres (TCs) play a vital role in education, resulting in the rapid growth of facilities that support the community's learning needs. The setting of a TC resembles a classroom environment, yet it operates informally, differing from the school-oriented structure. A private tutorial is a supplementary learning approach that follows the formal curriculum standards offered by school teaching (Bray, 1999; Hon, 2010). UNESCO emphasizes that access to quality education is a fundamental human right and promotes a rights-based approach in all educational efforts (Pigozzi, 2004). This approach addresses learning on two fronts. For learners, education should recognize their prior knowledge, incorporate both formal and informal learning, ensure non-discrimination, and provide a secure and supportive environment. The system requires robust structures to implement policies, enforce laws, allocate resources effectively, and evaluate learning outcomes to maximize the impact on all learners (UNESCO, 2005, p. 30). Figure 1 illustrates shadow education's evolution and future direction over three decades. The framework improves shadow education by integrating it with formal education and socio-economic development, fostering a holistic and synergistic approach. The associated phases in achieving better education quality align with the Sustainable Development Goals (SDG-4). It helps to oversee the education gap between resources, time, and support while upgrading the education facilities for a safe and conducive learning environment.

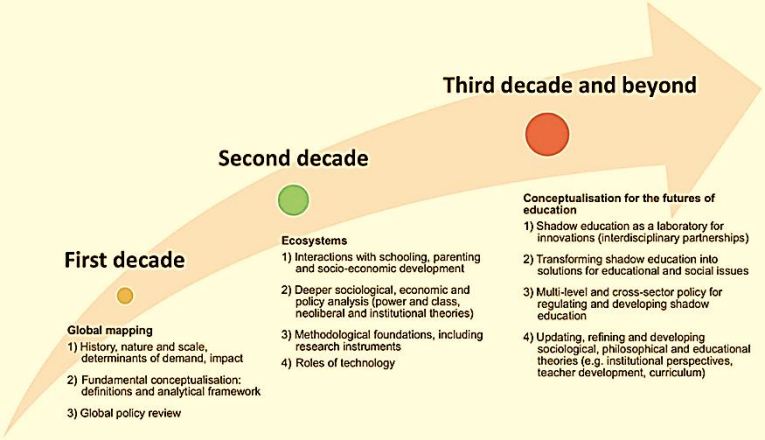


Fig. 1: Emphases in comparative research on shadow education across the decades
Source: Zhang W., Bray M. (2020)

Therefore, this study aims to explore fire safety issues in TC operating in shop offices by reviewing past fire incidents and assessing compliance with existing fire safety regulations. The objectives of the study are:

1) To review fire incidents and related issues involving TCs reported in local and international news.
2) To identify the applicability of an integrated framework for improving fire safety in TC buildings.

2.0 Literature Review

2.1 Fire Safety in Tuition Centre Building

Ensuring fire safety in educational spaces, especially TCs, demands a holistic approach incorporating initial preventive measures and ongoing maintenance. Compliance with fire safety regulations is crucial to safeguarding students and staff, protecting infrastructure, and maintaining the continuity of educational activities. A comprehensive understanding of the various elements influencing fire safety is essential for implementing effective risk mitigation strategies. Bakthiary et al. (2023) revealed that building renovations, expansions, or changes in occupancy could elevate fire risks, necessitating a reassessment of fire safety conditions. Therefore, establishing a clear direction for evaluating and enhancing fire safety in existing structures is significant to mitigating potential hazards.

The Education Act 1996 serves as the fundamental legal framework for Malaysia's education sector. With reference to the Education Act 1996, Subsection 83 (1), TCs are required to operate within shophouses or commercial buildings. Any nonconformity from these prescribed premises is mandated by prior approval from the local authorities to ensure regulatory compliance. Fire statistics reported a persistently high number of structural fire cases in Malaysia, with 9352 cases in 2023, 8348 recorded in 2022, 7,477 in 2021, 6,910 in 2020, and 7,393 in 2019 (Figure 2). Analysis of fire incidents highlighted that shop premises are the second most affected category, after residential properties. Although the annual figures varied, fire occurrences remain a significant concern. Since TCs are often housed within shop office premises, strict adherence to fire safety regulations is key to securing approval from Local Authorities for business licensing. Mustafa et al. (2024) agreed that implementing robust fire safety measures in TCs is vital for safeguarding the well-being of students and staff. Due to these fire incidents it supported the explanation of Zhang (2023) that regulating tutoring centre premises is a reasonable step for authorities seeking greater oversight, as physical spaces are easier to define and monitor. It also highlighted that

TCs must typically meet general health and safety standards, including fire escapes, hygiene, and noise control, with some jurisdictions also requiring education-specific criteria like minimum space per student.

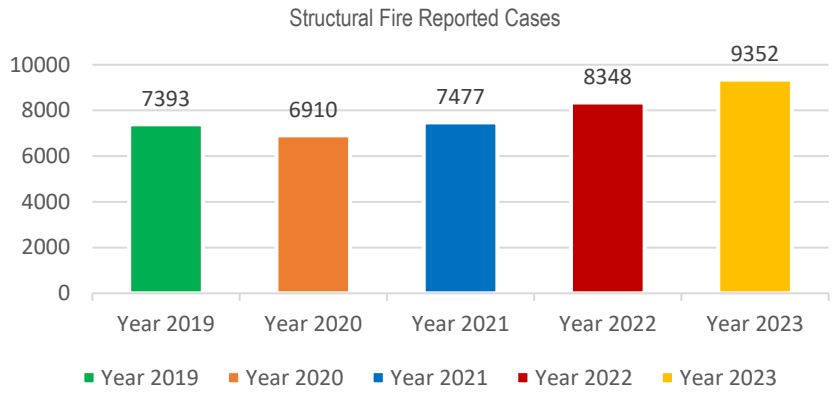


Fig. 2: Structural Fire Reported Cases from 2019 to 2023
Source: Annual Report of Fire and Rescue Department Malaysia (2023)

2.2 Regulatory Requirements for Tuition Centre Building

TCs in shop offices that have already been granted a Certificate of Completion and Compliance (CCC) must undertake renovations to comply with relevant regulations when upgrading to a formal tuition facility. Following the Guideline Procedure on the Issuance of Renovation Permits under Section 18 of the Uniform Building By-Law (UBBL) 1984, any proposed renovation work must obtain prior approval from the Local Authority to ensure compliance with the provisions outlined in Section 79(1) of the Street, Drainage, and Buildings Act 1974. The qualified premise should convey the relevant standards as listed in Education Regulations (Private Educational Institutions) Standards 1998, P.U.(A) 219/98):-

i. Maintenance
ii. Lightings, ventilation and premise space
iii. Classroom requirement
iv. Basic amenities of the premise
v. Renovation work
vi. Health and safety
vii. Premise usage

Additionally, bypassing the proper approval process can have severe consequences, particularly in failing to meet fire safety requirements in the renovated building. As described in Section 32, Act 341, Fire Services Act 1988, as long as a fire certificate remains valid for a given premise, the Director General holds the authority to inspect any section of the premises at a reasonable time. When a shop office is renovated to refurbish as a TC, the FRDM must conduct a physical inspection to verify compliance with fire safety regulations.

Kenayathulla and Ubbudari (2017) revealed the seven key criteria of TC that the Guidelines also drew for the Establishment and Registration of Private Educational Institutions in 1994. Following this, TC should be situated in a location that fosters a conducive environment for effective teaching and learning. It was further defined as follows:

a) Free from disturbances or threats of chemical hazards or waste pollution.
b) Not located near entertainment centres, gambling premises, recreational areas, or markets.
c) Not close to fire-prone areas, noisy workshops, rivers, or old buildings.
d) Not too close to other institutions offering similar courses.

Position Paper on Safety Against Fire in Buildings (2004) explained that changes in the use of premises frequently occur without adequate consideration of their impact on fire safety provisions. When buildings undergo refurbishment due to changes in occupancy, they may be subject to different or additional Building Codes and regulatory requirements (Zainuddin et al., 2023). For instance, converting shop offices into tuition centres or entertainment places significantly alters occupancy loads, placing greater demands on existing escape routes and active fire safety systems. Due to the increasing number of occupants, the additional capacity must be incorporated into fire escapes, and active fire safety measures must be improved and upgraded. However, these factors are often overlooked by both building owners and contractors. Moreover, architects and engineers are rarely consulted, as owners or tenants have no statutory obligation to seek professional advice.

Understanding the nature of occupancy is a crucial aspect of assessing risk profiles. It is a foundation for developing an effective fire safety strategy. As outlined in BS 9999:2017 The Occupancy Characteristic Categories for Different Types of Buildings, consideration should be made whether individuals within the building are familiar or unfamiliar with the building layout. The occupancy characteristics, either awake or asleep, will affect the evacuation time. These factors resulted in valuable insights into occupants' probable immediate responses and behaviours in the event of a fire or emergency, aiding in the preparation of appropriate safety measures.

According to Hamzah (2011), achieving full compliance with fire protection legislation when upgrading older buildings presents significant challenges for designers. Despite increasing architectural complexity, higher design expectations, and the pressure to minimize construction costs, buildings must still adhere to stringent safety standards to safeguard occupants, property, and the environment. Based on a previous study illustrated in Figure 3, the integrated framework has been outlined for improving fire safety in building operations, especially during fires and emergencies. Each component addresses essential aspects such as active protection systems, safety regulations, public awareness, and response preparedness, working cohesively to enhance fire safety and emergency response.

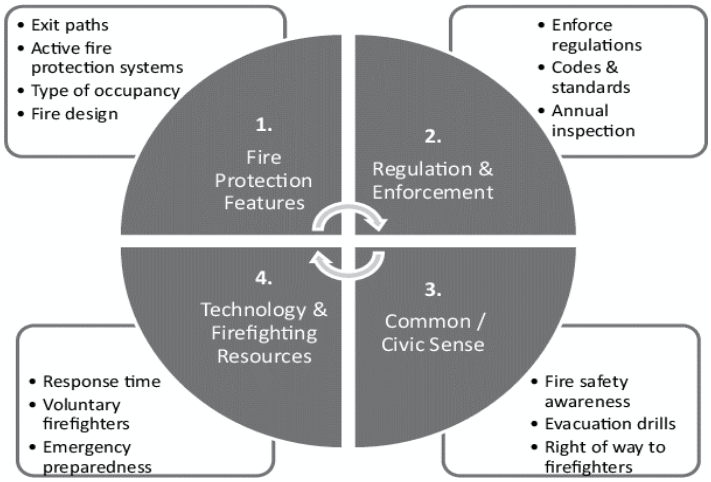


Fig. 3. An integrated framework to implement strategies for improving fire safety in buildings
Source: Kodur, Venkatesh K.R., Puneet Kumar and Muhammad Masood Rafi (2019)

3.0 Methodology

3.1 Qualitative Review

This study employed a qualitative method to achieve the objective of reviewing the fire incident and issues of TC reported through local and international news. The scope is limited to TC operated at the shop office. The focus is given through fire safety requirements outlined in the Uniform Building By-Law 1984 (UBBL), Education Act 1996, National Education Policy, Private Education Institution Policy, and Fire Services Act 1988. In addition, semi-structured interviews were conducted with the expert panel, including 4 officers from the FRDM and 3 professional architects who demonstrated an in-depth perspective on fire safety issues by considering the applicability of the integrated framework in improving fire safety. According to Trochim and Donnelly (2007), purposive sampling involves identifying participants based on specific criteria relevant to the study's objective. Therefore, the selection is based on individuals with specialized knowledge and experience to provide valuable insights into the 4 elements in the framework. The research reviews past fire incidents and related safety issues in TC buildings to learn valuable lessons and address the compliance requirements to improve fire safety.

4.0 Findings

4.1 Article Review

The tangible evidence reported in 2024 that a fire broke out at a children's TC in Batu Pahat, Johor, at 9.37 pm. The incident prompted the evacuation of customers and employees from a nearby supermarket. The fire originated on the upper floor of a two-story shop building, involved two shop units, and required nearly two hours to extinguish fully. No casualties were reported at the TC as it was closed at 6 pm (Figure 4a). Another documented case, reported in 2022, involved a fire at a TC in Miri, which is located above a pharmacy. The fire caused 30% damage to the interior of one of the TC's rooms (Figure 4b). Figure 4c shows that another fire outbreak was reported in 2017 in Petaling Jaya. The incident involved an explosion at a motorcycle shop on the ground floor, affecting the TC on the abovementioned level. As a result, the children were forced to evacuate quickly using the internal staircase, which was too dangerous.

Based on Figure 4d reported that the State Government of Johor has instructed the immediate closing of all illegal education centre operations. The instruction has been officially announced to ensure the safety of students and teachers. Hence, FRDM has been instructed to take action on the Illegal TCs. Another 81 illegal TCs were reported operating in Seberang Prai without a business license from the Local Council and State Education Department. In this situation, parents are advised to check for a valid TC license from the owner before enrolling their children, as it ensures compliance with safety and regulatory requirements. (Figure 4e). Additional evidence, as stated in Figure 4f, highlighted that almost 40% of the 250 TCs in Seberang Prai were operating in unsuitable locations and in

buildings that were potential fire traps. The council found that many of the premises did not obtain the necessary approvals from the authorities. The centres have been merely operating with renewable temporary permits issued by the State Education Department.

Following the internationally reported cases at Gujerat's Surat, India, a devastating fire broke out at the Takshashila Arcade, resulting in the tragic deaths of 22 students and injuries to 19 others. The fire was caused by an electrical short circuit at the air conditioning compressor on the ground floor, rapidly spreading to the upper levels of the coaching centre. Investigations revealed that the building lacked proper fire safety measures, and unauthorized constructions had been made, leading to the arrest of the coaching centre owner and two builders. In response, the Gujarat government ordered the closure of all coaching centres operating in commercial complexes until they complied with fire safety norms (Figure 4g).

Pusat tuisyen terbakar, pelanggan pasar raya bertempiaran lari

Oleh Alias Abd Rani - Julai 23, 2024 @ 2:08pm bhnews@bharian.com.my

BATU PAHAT: Pelanggan dan pekerja sebuah pasar raya di Taman Evergreen Height di sini, bertempiaran lari selepas sebuah pusat tuisyen kanak-kanak terbakar, malam tadi.

Kebakaran pusat tuisyen di tingkat atas bangunan rumah kedai dua tingkat itu disedari pada jam 9.30 malam oleh seorang pekerja pembersihan sebelum memaklumkan kepada seorang kakitangan pasar raya terbabit.

Pekerja pasar raya, Mubd Azhar Azman, 32, berkata ketika pekerja pembersihan wanita memberitahu premis tingkat atas terbabit bangunan itu terbakar.

"Waktu itu memang ramai pelanggan, ...semua lari, ada yang bawa troli sehingga langgar kereta di parkir hadapan pasar raya.

"Kami tidak terfikir apa-apa bau hangit. Saya segera naiki tangga untuk melihat kejadian sebenar, namun gagal kerana asap sudah memenuhi semua ruang atas bangunan," katanya ditemui di lokasi.

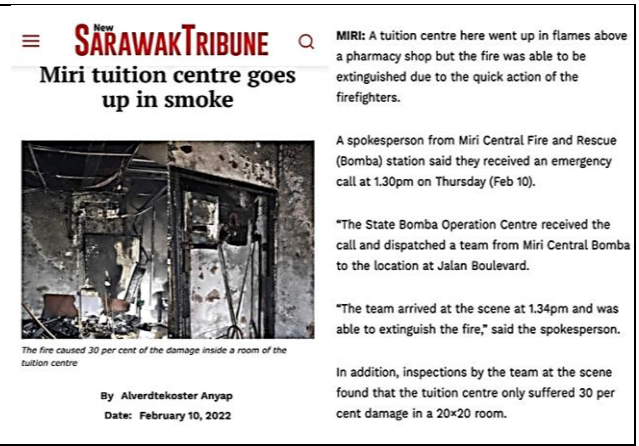
Jelasnya, pusat tuisyen kanak-kanak ditutup sekitar jam 6 petang, setiap hari.

Dalam pada itu, Ketua Balai Bomba dan Penyelamat Batu Pahat, Ayub Majid berkata, pihaknya menerima panggilan kecemasan jam 9.37 malam.

"Kebakaran itu membabitkan dua unit kedai dan kami mengambil masa hampir dua jam untuk memastikan api dipadam sepenuhnya. Tiada kemalangan jiwa," katanya.

Anggota bomba memadam kebakaran sebuah pusat tuisyen kanak-kanak di Taman Evergreen Height, malam tadi. - Foto NSTP/Alias Abd Rani

(a) Tuition centre on fire, Batu Pahat, Johor
Source: Berita Harian, dated 23rd July 2024



New SARAWAK TRIBUNE

Miri tuition centre goes up in smoke

The fire caused 30 per cent of the damage inside a room of the tuition centre

By Alverdtekoster Anyap

Date: February 10, 2022

MIRI: A tuition centre here went up in flames above a pharmacy shop but the fire was able to be extinguished due to the quick action of the firefighters.

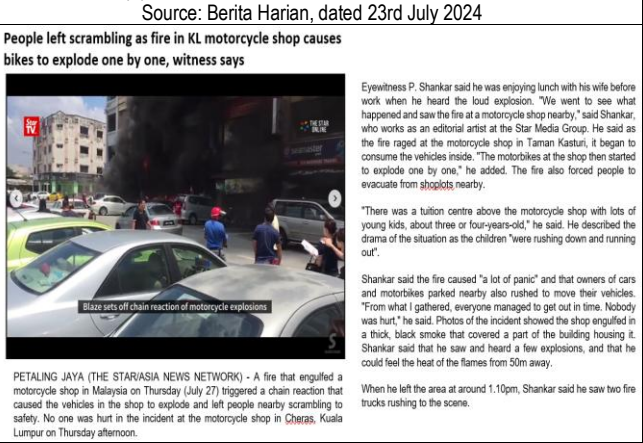
A spokesperson from Miri Central Fire and Rescue (Bomba) station said they received an emergency call at 1.30pm on Thursday (Feb 10).

"The State Bomba Operation Centre received the call and dispatched a team from Miri Central Bomba to the location at Jalan Boulevard.

"The team arrived at the scene at 1.34pm and was able to extinguish the fire," said the spokesperson.

In addition, inspections by the team at the scene found that the tuition centre only suffered 30 per cent damage in a 20×20 room.

(b) Miri tuition centre goes up in smoke
Source: The New Sarawak Tribune dated 10th February 2022



People left scrambling as fire in KL motorcycle shop causes bikes to explode one by one, witness says

Blaze sets off chain reaction of motorcycle explosions

PETALING JAYA (THE STAR/ASIA NEWS NETWORK) - A fire that engulfed a motorcycle shop in Malaysia on Thursday (July 27) triggered a chain reaction that caused the vehicles in the shop to explode and left people nearby scrambling to safety. No one was hurt in the incident at the motorcycle shop in Cheras, Kuala Lumpur on Thursday afternoon.

Eyewitness P. Shankar said he was enjoying lunch with his wife before work when he heard the loud explosion. "We went to see what happened and saw the fire at a motorcycle shop nearby," said Shankar, who works as an editorial artist at the Star Media Group. He said as the fire raged at the motorcycle shop in Taman Kasturi, it began to consume the vehicles inside. "The motorbikes at the shop then started to explode one by one," he added. The fire also forced people to evacuate from shoplots nearby.

"There was a tuition centre above the motorcycle shop with lots of young kids, about three or four-years-old," he said. He described the drama of the situation as the children "were rushing down and running out".

Shankar said the fire caused "a lot of panic" and that owners of cars and motorbikes parked nearby also rushed to move their vehicles. "From what I gathered, everyone managed to get out in time. Nobody was hurt," he said. Photos of the incident showed the shop engulfed in a thick, black smoke that covered a part of the building housing it. Shankar said that he saw and heard a few explosions, and that he could feel the heat of the flames from 50m away.

When he left the area at around 1.10pm, Shankar said he saw two fire trucks rushing to the scene.

(c) Fire in KL motorcycle shop that affected the tuition centre
Source: The Star and Asia News Network, dated 27th July 2017

Johor arah tutup operasi pusat pendidikan haram

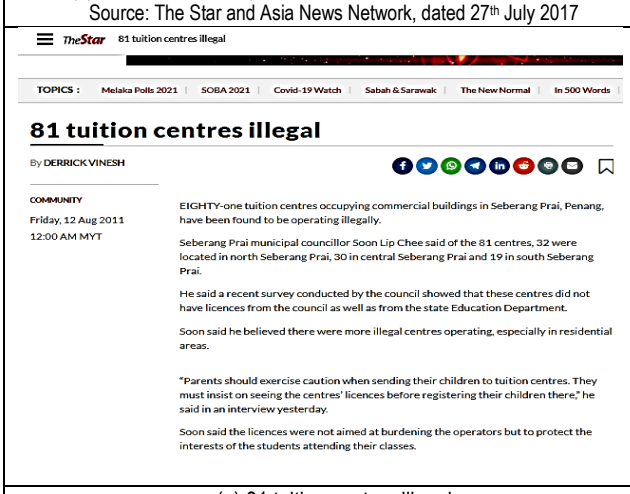
JOHOR BAHRU: Kerajaan negeri mengarahkan Jabatan Pelajaran Negeri Johor (JPNJ) menutup operasi pusat pendidikan haram di seluruh negeri dalam memastikan tahap keselamatan pelajar dan guru.

Pengerusi Jawatankuasa Kesihatan, Alam Sekitar, Pendidikan dan Penerangan negeri, Datuk Ayub Rahmat, berkata orang ramai yang mempunyai maklumat berhubung kewujudan pusat pendidikan haram boleh terus menyalurkannya kepada JPNJ.

Katanya, beliau juga sudah mengarahkan JPNJ dan Jabatan Pendidikan Daerah mengambil tindakan segera mengenai pasti sekolah, pusat tuisyen, rendah dan menengah kerajaan mahupun swasta untuk diserahkan kepada Jabatan Bomba dan Penyelamat Malaysia (JBPM) bagi tindakan lanjut.

"Saya juga sudah mengarahkan JPNJ untuk memberikan tindakan tegas dan tidak teragak-agak menutup operasi pusat pendidikan haram di negeri ini demi memastikan keselamatan para pelajar dan guru terutamanya di negeri ini agar tidak berlaku.

(d) Closure of illegal education centres operation
Source: Berita Harian, dated 15th September 2017



TheStar 81 tuition centres illegal

TOPICS : Melaka Polls 2021 | SOBA 2021 | Covid-19 Watch | Sabah & Sarawak | The New Normal | In 500 Words |

81 tuition centres illegal

By DERRICK VINESH

COMMUNITY

Friday, 12 Aug 2011

12:00 AM MYT

EIGHTY-one tuition centres occupying commercial buildings in Seberang Prai, Penang, have been found to be operating illegally.

Seberang Prai municipal councillor Soon Lip Chee said of the 81 centres, 32 were located in north Seberang Prai, 30 in central Seberang Prai and 19 in south Seberang Prai.

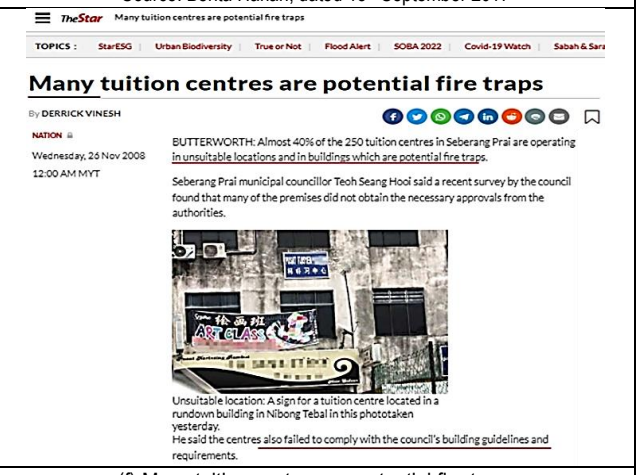
He said a recent survey conducted by the council showed that these centres did not have licences from the council as well as from the state Education Department.

Soon said he believed there were more illegal centres operating, especially in residential areas.

"Parents should exercise caution when sending their children to tuition centres. They must insist on seeing the centres' licences before registering their children there," he said in an interview yesterday.

Soon said the licences were not aimed at burdening the operators but to protect the interests of the students attending their classes.

(e) 81 tuition centres illegal
Source: The Star and Asia News Network dated 12th August 2011



TheStar Many tuition centres are potential fire traps

TOPICS : StarESG | Urban Biodiversity | True or Not | Flood Alert | SOBA 2022 | Covid-19 Watch | Sabah & Sara

Many tuition centres are potential fire traps

By DERRICK VINESH

NATION

Wednesday, 26 Nov 2008

12:00 AM MYT

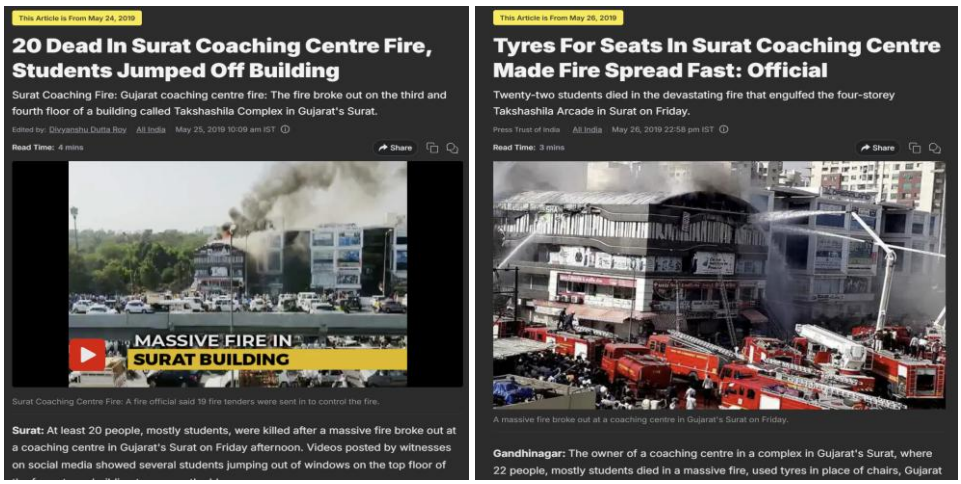
BUTTERWORTH: Almost 40% of the 250 tuition centres in Seberang Prai are operating in unsuitable locations and in buildings which are potential fire traps.

Seberang Prai municipal councillor Teoh Seang Hooi said a recent survey by the council found that many of the premises did not obtain the necessary approvals from the authorities.

Unsuitable location: A sign for a tuition centre located in a rundown building in Nibong Tebal in this phototaken yesterday.

He said the centres also failed to comply with the council's building guidelines and requirements.

(f) Many tuition centres are potential fire traps
Source: The Star dated 26th November 2008



(g) Coaching Center Fire, Surat (24th May 2019)
Source: https://www.ndtv.com/india-news/surat-coaching-center-fire-tyres-for-seats-made-fire-spread-fast-official-2043311

Fig. 4: News Reported on Fire Incident and Illegal Tuition Centres Operation

Based on Table 1, it summarizes the occurrences of fire incidents and issues of TC locally and internationally indicating the number of fires reported, death, injuries and causes of fire from 2008 until 2024.

Table 1. Fire incidents and fire safety issues at tuition centre building

No.	Source/ Date	News Headline	Number of fires reported	Number of Death	Number of injuries	Cause			
						Faulty Electrical Wiring	Use of Combustible Materials	Short Circuit in HVAC Compressor	Others
1.	Harian Metro/ 23rd July 2024	Tuition center on fire, supermarket customers flee in panic. "Pusat tuisyen terbakar, pelanggan pasar raya bertempiaran lari."	1	0	0	0	0	0	1
2.	https://www.tiktok.com/@fatehtyreofficial/video/7396099580477066504	Fire at Fateh Tyre & Auto near Tuition Centre Skill Asia	1	0	0	0	1	0	1
3.	New Sarawak Tribune, 10th Feb 2022	Miri tuition centre goes up in smoke	1	0	0	1	0	0	0
4.	The Star / Asia News Network, 27th July 2017	People scramble as motorbikes in shop explode one by one	1	0	Unknown	0	1	0	1
5.	Berita Harian 15th Sept 2017	Johor orders the closure of illegal education centres. "Johor arah tutup pusat pendidikan haram."	0	0	0	0	0	0	1
6.	The Star 12th Aug 2011	81 tuition centres illegal.	0	0	0	0	0	0	1
7.	The Star, 26th Nov 2008	Many tuition centres are potential fire traps.	0	0	0	0	0	0	1
8.	NDTV, 24th May 2019	20 Dead in Surat coaching center fire, students jumped off building	1	22	19	1	1	1	0

5.0 Discussion

The reviews were based on feedback interview sessions with expert panels from FRDM (FD1, FD2, FD3, FD4) and professional architects (AR1, AR2, AR3), and they were based on the integrated framework shown in Figure 3.

5.1 Fire Protection Features

In the context of fire safety of TC buildings, adequate fire protection features may be lacking to address safety challenges in contemporary structures, mainly where cost-effective solution is the key factor. FD1 and FD2 have agreed that the strategies of using

non-combustible materials, fire compartments, reducing glass usage and limiting open spaces are among the safest costs. FD3, AR1, and AR2 added that a strategic exit route and external exit staircase may enhance faster evacuation and means of escape. FD4 and AR3 have pointed out that the occupancy load should be strictly followed to ensure the classroom requirement is effectively occupied. Accurate calculations are crucial to ensure that classroom sizes are adequately designed to safely accommodate the intended number of students during lessons. Upon discussions with the FR4, the design of external escape staircases emerged as a significant concern. Many TC owners were unaware that these staircases must be constructed in compliance with specific requirements set by the FRDM. This includes factors such as appropriate size, shape, protection in the "no-opening zone," and the use of approved materials.

5.2 Regulation & Enforcement

Compliance with these fire safety standards is vital for the smooth and safe operation of the TC. It is strongly recommended that TC owners technically understand the relevant acts and regulations related to TC requirements. Another critical point of discussion among FD1, FD2, FD3, and FD4 was the issue of travel distance. It is essential to carefully assess the travel distance to fire exits, ensuring that escape routes provide the shortest path to the designated assembly area. This assessment should consider unprotected and protected areas that lead directly to exits. AR1 and AR2 explained that the architect must prepare an as-built drawing for applying the Fire Certificate to FRDM by justifying the travel distance, designated exit door and final exit for safe evacuation.

5.3 Common and Civic Sense

Fire hazards often result from a lack of public awareness and civic responsibility. Community engagement is vital in bridging this gap by promoting responsible behaviour and reducing negligence, a common cause of fire incidents. FD1-FD4 recommended keeping ignition sources away from flammable items, avoiding faulty electrical wiring, using fire extinguishers properly, and giving way to emergency vehicles, which should be practised to reduce fire risks significantly. FD4, AR1, AR2 and AR3 highlighted that public awareness should be increased through media and mandatory school fire safety lessons to build common sense and civic responsibility. FD4 encourages all TCs to collaborate with BOMBA in conducting regular fire drills. AR3 also suggested that the students and teachers familiarize themselves with the building layout to create a fear-free evacuation process.

5.4 Technology and Firefighting Resources

FD1-FD4 explained that fire safety efforts should reduce response time, develop firefighting resources, improve design and planning, and learn from past incidents to update building codes. Shorter response times help control fires early and ensure safe evacuations. Despite this, fire safety systems can be automatically monitored using sensors instead of being checked manually. This ensures that time is saved and safety measures remain continuously active rather than only during scheduled inspections. In developing countries, training volunteer firefighters can address workforce shortages and increase public awareness.

6.0 Conclusion and Recommendations

In conclusion, lessons learned from fire incidents and issues related to illegal operations have highlighted the importance of strict fire safety compliance in TCs, particularly those operating at shop offices. Ensuring adherence to fire safety regulations is crucial for creating a safe learning environment. Maintaining these premises with the utmost attention to safety protocols is crucial to protecting lives. Compliance with fire safety regulations under the Private Educational Institutions (PEI) framework is compulsory, requiring approval from the FRDM, with architects playing a key role in designing safe educational spaces. The findings were derived from a review of reported fire incident cases, revealing that the primary causes of fire were the use of combustible materials and faulty electrical wiring. Additional contributing factors included fire spreading from adjacent buildings, the illegal status of tuition centres due to non-compliance with fire safety regulations, and the deteriorated condition of old buildings, which increased the risk of fire entrapment. Semi-structured interviews with FRDM officers and architects emphasized the need for stricter enforcement of fire safety compliance due to the limited technical knowledge among TC owners. Promoting safety awareness among students, teachers, and parents through public campaigns, fire drills, and workshops is recommended to foster a safety-conscious community. A new direction for this study is to evaluate the effectiveness of fire safety awareness and training among TC operators, staff, and students. Additionally, it may explore the potential for retrofitting guidelines tailored to TCs in shop offices to enhance compliance with fire safety regulations.

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Paper Contribution to Related Field of Study

This study raises awareness among students, teachers, parents, and TC providers about fire safety compliance, promoting proactive measures to ensure a secure and resilient learning environment.

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