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NIOSH
National Institute Of Occupational Safety And Health

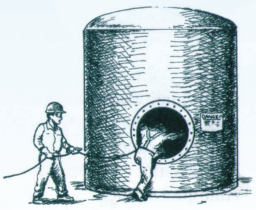
CONTENT HIGHLIGHTS

- HAZARD RECOGNITION
- PERSONAL PROTECTIVE EQUIPMENT (PPE)
- TECHNICAL RESCUE
- PSYCHOLOGICAL ASPECTS OF RESCUE

CONFINED SPACE RESCUE

CONFINED SPACE RESCUE

CONFINED SPACE ENTRY



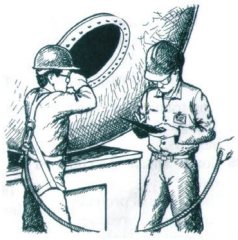
A confined space has the following characteristics:

- Its size and shape allow a person to enter it.
- It has limited openings for workers to enter it.
- It is not designed for continuous occupancy.

A permit-required confined space has one or more of the following characteristics:

- It contains or has a potential to contain a hazardous atmosphere.
- It contains a material that has the potential for engulfing the entrant.
- Its internal configuration is such that an entrant could be trapped or asphyxiated inwardly converging walls or by a floor which slopes downward to a smaller cross section.
- It contains any other recognized serious safety or health hazards.

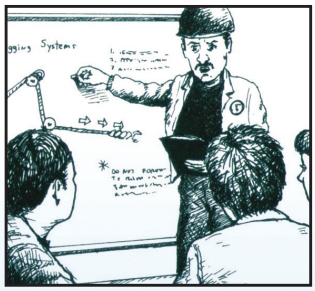
If the confined space you work in meets these conditions your employer will use a variety of methods to protect you:



- Lockout procedures
- Authorized entry and attendant supervisor
- Atmosphere testing
- Ventilation systems
- Non-entry rescue procedures
- Training in permit space hazards, use of required equipment, safe work practices and rescue procedures.

THE RESCUE TEAM

Your employer will decide whether an off-site or in-plant rescue service will best meet your company's needs. If it is decided that an in-plant team will be organized, qualified co-workers will be designated and trained in confined space rescue.



You may try out for your rescue team. To qualify you will need:

- Physical fitness and health
- Good endurance
- Enthusiasm
- Willingness to learn
- Team-oriented attitude

Once you have made the rescue team you will receive extensive on going training. You also will be expected to maintain current certification in first aid and cardiopulmonary resuscitation (CPR).

During training you will learn how to:

- Recognize confined space hazards.
- Communicate in a confined space.
- Use personal protective equipment in rescues.
- Perform rescue techniques geared to the confined spaces in your workplace.
- Know when to perform self- rescue in a confined space.

HAZARD RECOGNITION

An important aspect of your rescue training will be learning how to identify and deal with confined space hazards such as:

Hazardous atmosphere

- The air may be oxygen deficient.
- The air may be flammable or toxic.
- The air may irritate your eyes and lungs.
- Solvents used in the permit space can produce harmful vapours that are especially dangerous in a closed area.
- Sanding, scraping or loosening residue can stir up hazardous materials.

- **Engulfment — being trapped in liquid or solid material**
- **Danger from unexpected movement of machinery**
- **Electrocution**
- **Suffocation from being wedged in a narrow space.**

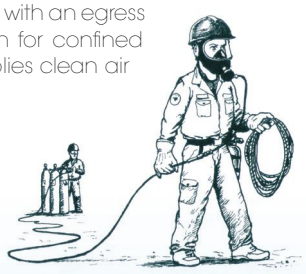
PERSONAL PROTECTIVE EQUIPMENT (PPE)

You should wear appropriate personal protective equipment such as helmets and fully encapsulated suits to meet the confined space hazards of your workplace.

RESPIRATORS

SAR

A supplied-air respirator (SAR) combined with an egress bottle is the safest respiratory protection for confined space rescue because this system supplies clean air from outside the permit space.



- Air is delivered through a hose from a source outside the confined space.
- An unlimited air supply is provided.
- No bulky cylinder is required.

SCBA

When rescuers risk air-line entanglement, the self-contained breathing apparatus (SCBA) with sufficient air supply for entry, rescue and escape may be advisable. With the SCBA, the first rescuer should enter by backing into the space, holding the tank in front of him or her.

- Air supply is carried in a cylinder on your back, which may make it difficult or impossible to enter certain confined spaces.
- You have a limited air supply.
- An Air Manager, trained in SCBA use, will monitor time and air supply to help ensure the rescuer has enough time for safe exit from the space.
- The more strenuously you exert yourself, the faster you use up your air.

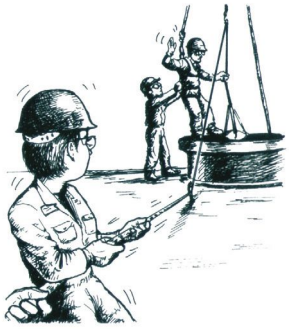
Tips About Respirators

- Air-purifying respirators only filter the surrounding air, which will not help you if the air does not contain enough oxygen.
- Contaminants are less likely to leak into a positive-pressure respirator with a full face piece.

Respirator Checklist

- Check the respirator for proper fit each time you wear it.
- Exhale forcibly through the exhalation valve in the face piece to prevent carbon dioxide build-up in the mask which will cause you to breathe faster.
- When rappelling with an SCBA, all harness straps should be fastened and snug with your helmet in place over your face piece
- Establish hand signals before entering a confined space, especially when using respiratory protection.

TECHNICAL RESCUE

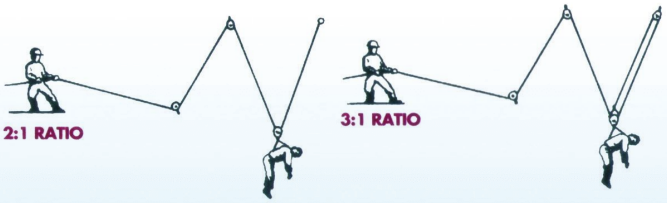


General Information

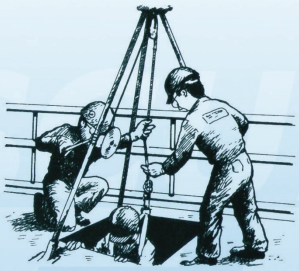
Technical rescue involves the use of specially designed equipment and hauling systems based on mechanical theory. Using a system of ropes and pulleys a rescuer can employ mechanical advantage to haul people safely and rapidly. In other words, with mechanical advantage, it takes less effort to move a load.

Mechanical Advantage

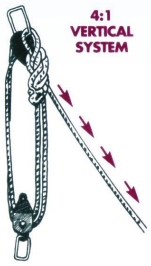
Example: If it takes 100 pounds of force to move a 100-pound load, that is a 1:1 mechanical advantage. In hauling systems, traveling pulleys create mechanical advantage, while anchored pulleys simply change the direction of the pull. (The angles shown here are exaggerated for illustration and should be tightened up in actual set up.)



Rescue Systems



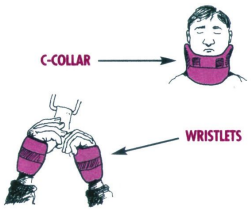
- **Non-entry rescue** is the safest method because the rescuer is not endangered in the confined space. A worker is lowered into the space wearing a retrieval line attached to a body harness at one end and a mechanical winch at the other end. That way, in an emergency, rescuers can pull the worker out without going in.
- **Entry rescue** is used when the confined space contains obstacles that prevent the rescue team from lifting the victim straight up and out of the space.
  - The Simple 4:1 Vertical System allows the rescuer to be lowered into a shaft. This system can then be adjusted to haul the rescuer and victim.
  - A Complex 4:1 Piggyback System is created by stacking one simple mechanical advantage system on top of another. This system allows easy conversion from a lowering system to a hauling system and back. It also may be attached to any line that has been used for lowering or rappelling.



The Victim

Once you reach the victim, assess his physical condition and mental state. Make sure he is calm and comfortable. Be alert for signs of panic and shock. If the victim is unconscious:

- Keep his head stable and air passages open.
- You may place a C-collar around his neck to help maintain an airway.
- When performing a vertical lift with no traumatic injuries, you may use wristlets to keep the victim's arms fastened above his head, which will help during escape from the confined space.



If the victim is injured:

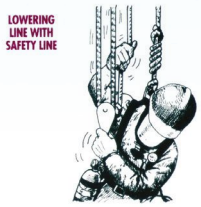
- The victim's spine should be immobilized in all trauma-related cases.
- You can use a lightweight plastic Sked to pull him to safety.
- NEVER move or care for an injured victim unless you have been trained to administer first aid.

Rope and Rescue Rigging Systems
All rope must meet the NFPA safety factor for tensile strength of 15:1.

Static, low-stretch Kernmantle is a nylon-sheathed rope used for control during a rescue or as a retrieval line.

Tips on rope use:

- Always use new rope in a rescue and then destroy it.
- Training rope can be reused, but safety lines with commercial shock absorbers should always be used in case the primary line fails.
- Protect rescue rope from exposure to direct sunlight, acid, dirt and grit as well as high temperatures which can damage it.
- Do not walk or stand on rope.
- Inspect rope used in training carefully by feeling it and looking for damage.
- When in doubt about the safety of rope, cut it up and throw it away.



Knot Tying

- Tying knots can make rope less efficient, so choose knots which avoid acute bends.
- Provide additional safety to a knot by tying an overhand knot without any loose ends.

Anchor Points for Rigging Systems

- Steel beams make the strongest and best anchor points.
- Other good anchors include concrete structural columns, window washer eye bolts and large machinery supports.
- NEVER use guy wire hooks, insulated pipes or flimsy handrails.
- Pad all abrasion points or sharp edges and check them frequently.
- Avoid hard links such as carabiners to carabiners.
- Avoid running nylon lines coming in contact with standing nylon lines.

REMEMBER:
Your rescue rigging system is only as strong as the weakest link.

Tips on Rigging Systems

- Always use safety lines and backup hardware.
- Double check all rigging by sight and touch.
- Know your equipment, its proper name, strengths and weaknesses.
- Control equipment by keeping it clipped to your harness.
- Inspect equipment for damage frequently and clean as recommended by the manufacturer.

PSYCHOLOGICAL ASPECTS OF RESCUE

At some point during a confined space rescue you will probably face fear, but you can learn to deal with your feelings. Remember these tips on dealing with fear:

- Do not fight feelings of anxiety or fear.
- When fear arrives, pause.
- Focus on your rescue goal.
- Monitor your fear by measuring it on a scale from one to ten.
- Learn to appreciate functioning with a level of fear. Controlled fear keeps you alert.

SUMMARY

One of the most important goals of confined space rescue training is learning to work as a team. Everyone on the team plays an important role in the rescue effort. If all members work together as a smoothly functioning unit, your confined space rescue can be safe and successful.

REVIEW

- Before entering a permit-required confined space as a rescuer, you should have training in:
  - Obtaining and following the proper permits
  - Communications and hazard recognition
  - First aid and CPR
  - The correct personal protective equipment (PPE)
  - Self rescue.
  - Other types of necessary protection may include lockout procedures, safety lines, attendant and ventilation systems.
- There are two types of respirators that can be used during rescue:
  - **SAR** (supplied-air respirator): The air is delivered through a hose. This may present an entanglement problem.
  - **SCBA** (self-contained breathing apparatus): The air supply is carried on your back. The air supply is limited and may be too bulky for the confined space.
  - With either type of respirator, exhale forcibly through the exhalation valve to prevent C02 build up.
- A Technical Rescue involves the use of specially designed equipment and hauling systems, depending on whether the rescue is internal or external.
- Upon reaching the victim:
  - Check for signs of panic or shock.
  - Keep the head stable.
  - Use a C-collar to help maintain the airway if necessary.
  - Use a Sked to pull an injured victim to safety.
- Rescue ropes must always meet the NFPA safety standard for tensile strength of 15:1.
  - Static low-stretch rope should be used for retrieval.
  - Always use new ropes, and destroy damaged or old ropes.
- Remember, when facing fear in a rescue situation, pause, focus on your goal and learn how to function with a level of fear.

Source:
Confined Space Rescue
Coastal Safety Environmental

Crash report ready

GENTING BUS TRAGEDY:
Probe panel sought clarification from 10 heads of agencies

BALQIS LIM
KUALA LUMPUR
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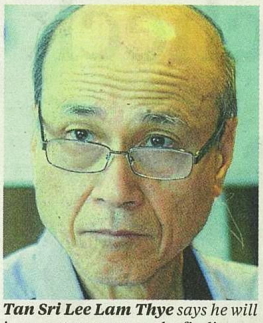


Tan Sri Lee Lam Thye says he will issue a statement on the findings

THE Independent Advisory Panel to the transport minister will submit to the ministry tomorrow the evaluation report on the Aug 21 Genting Highlands bus crash.

Its chairman, Tan Sri Lee Lam Thye, said yesterday he would submit the report at 1pm.

He said the six-member panel had held meetings and made two visits to the crash site.

In the course of its review of the reports from the Malaysian Institute of Road Safety Research (Miros), the Land Public Transport Commission, Road Transport Department and the police, the panel had sought clarification from the heads of 10 agencies and parties.

"We sought clarification from various departments, including the bus company, Genting Malaysia Bhd, and local authorities concerning aspects we were not clear about."

Lee said he would issue a statement detailing the findings and recommendations of the panel after presenting the report to Acting Transport Minister Datuk Seri Hishammuddin Hussein.

In the accident at Km3.6 of Jalan Genting Highlands-Kuala Lumpur, 37 people were killed and 16 injured, making it was the worst road accident in the country. Following the tragedy, Hishammuddin had announced the establishment of an independent panel under the ministry on Oct 29.

On a similar matter, Lee, who is also the National Institute of Occupational Safety and Health chairman, proposed that all crane operators be fully trained and certified.

"It is a frequent occurrence these days for cranes to fall. It can be prevented if the operator is certified."

He was commenting on the incident of a crane collapsing near the Penang Free School in Jalan Masjid Negeri yesterday morning.

In the 3.30am incident, the crane that was stationed at the site for street lamp repairs fell, with its boom hanging precariously across the median, rendering the rightmost car lane impassable.

At 6.30am, a 50-year-old motorcyclist died at the scene when her vehicle crashed into the heavy machine.

HEADLINE: CRASH REPORT READY
Publication : NST
Date of publication : Jan 27, 2014
Page number : 005
Byline/Author: **Balqis Lim**

Lori bawa bahan kimia terbalik, lebuh raya dekat Jelapang tutup tujuh jam

IPOH – Gara-gara sebuah lori tangki membawa cecair formaldehid terbalik dalam kemalangan yang turut melibatkan dua buah kereta di Kilometer 269.8 Lebuh Raya Utara-Selatan berdekatan Jelapang di sini semalam menyebabkan laluan itu ditutup hampir tujuh jam.

Unit Bahan Berbahaya (Hazmat) Perak mengambil masa sehingga pukul 3 petang bagi membersihkan bahan toksik yang bocor daripada lori tangki tersebut.

Ketua Bahagian Ketenteraman Awam dan Trafik Daerah Ipoh, Deputi Superintendan Wan Sharuddin Wan Omar berkata, kejadian dari arah selatan itu berlaku pada pukul 7.10 pagi apabila lori tangki yang membawa 23 tan metrik cecair kimia itu dilanggar oleh kereta Toyota Corolla sebelum kereta sama turut melanggar Proton Saga BLM.

Menurut beliau, akibat kemalangan itu, lima mangsa cedera dan empat daripada mereka menaiki kereta Proton Saga iaitu Ooi Ah Lak, 67, Ooi Boey Hong, 57, Looi Hooi Choan, 67, dan Lim Phek Hua, 59.

Mangsa kelima yang cedera ialah pemandu lori tangki itu, Yeoh Chon Eng, 48.

Bagaimanapun, pemandu Toyota Corolla, Ahmad Saiful Ikram Abdul Rahman tidak cedera.

Wan Sharuddin memberitahu, semasa kemalangan kereta Toyota Corolla itu dalam perjalanan menuju ke Mersing, Johor, kereta Proton Saga BLM itu menuju ke ibu negera manakala lori tangki tersebut dalam perjalanan menuju ke Gebeng, Pahang.

"Pihak bomba berusaha mengawal situasi bahan kimia asid itu yang juga bersifat meruap, ekoran berlaku kebocoran tangki," kata beliau.

Sementara itu, Ketua Balai Bomba dan Penyelamat Ipoh P. Samasuvam berkata, laluan berkenaan dibuka semula sebaik Hazmat selesai menjalankan operasi pembersihan dan lori yang merentang lebuh raya dialihkan.

"Sebanyak 56 anggota bomba terlibat dalam operasi ini iaitu antaranya dari balai di Meru, Ipoh dan Pasir Puteh di samping lebih 40 petugas daripada agensi lain seperti PLUS, polis dan Jabatan Alam Sekitar," kata beliau.

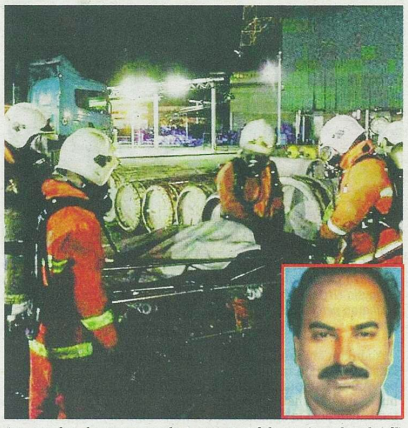
DUA anggota Hazmat menjalankan operasi pembesihan di lebuh raya berhampiran Jelapang, Ipoh semalam yang dicemari tumpahan bahan kimia.

INFO Formaldehid

- Merupakan sejenis bahan kimia yang mudah terbakar
- Bersifat menghakis
- Boleh menyebabkan pedih mata dan sukar bernafas sekiranya terdedah terlalu lama

HEADLINE : LORI BAWA BAHAN KIMIA TERBALIK, LEBUH RAYA DEKAT JELAPANG TUTUP TUJUH JAM
Publication : Kosmo
Date of publication : 10 Jan 2014
Page number : 03

Lelaki maut injap gas tercabut



*Anggota bomba **mengangkat mayat Krishnan (gambar kecil)** selepas terkena hos penyambungan gas ammonia ketika pemindahan ke lori tangki di Kawasan Perindustrian Tangga Batu, Melaka, semalam.* [FOTO MUHAMMAD HATIM AB MANAN/BH]

Melaka Tengah: Seorang penyelia loji gas maut apabila saluran injap yang menyambungkan hos ketika proses pemindahan gas ammonia ke dalam lori tangki, tercabut dan terpelanting mengenainya di Kawasan Perindustrian Tangga Batu di sini, semalam.

Kejadian jam 2.15 pagi itu menyebabkan M Krishnan, 53, dari Kota Laksamana, parah di kepala dan meninggal dunia di tempat kejadian.

Mayatnya dihantar ke Hospital Melaka untuk dibedah siasat.

Pemandu treler terhidu gas ammonia

Difahamkan, insiden itu turut menyebabkan seorang pemandu treler di loji itu dikejarkan ke hospital sama bagi menerima rawatan lanjut selepas terhidu gas ammonia.

Sumber Jabatan Bomba dan Penyelamat negeri, berkata pihaknya yang menerima panggilan pada jam 2.19 pagi, menghantar 25 anggota dari Balai Bomba dan Penyelamat Tangga Batu, Kubu dan Ayer Keroh bersama tiga jentera, termasuk sebuah jentera Pasukan Unit Bahan Berbahaya (HAZMAT) ke lokasi.

Anggota bomba berjaya menutup injap utama di tangki loji berkenaan dan mengawal kebocoran gas ammonia dalam masa 10 minit.

Sementara itu, abang mangsa yang dikenali sebagai Munusamy, 66, berkata adiknya bekerja di kilang berkenaan sejak 20 tahun lalu.

HEADLINE: LELAKI MAUT INJAP GAS TERCABUT
Publication: BH
Date of publication: Jan 15, 2014
Page number: 019

Journal of Occupational Safety and Health

The Administration of Marine Spill Response of Malaysia

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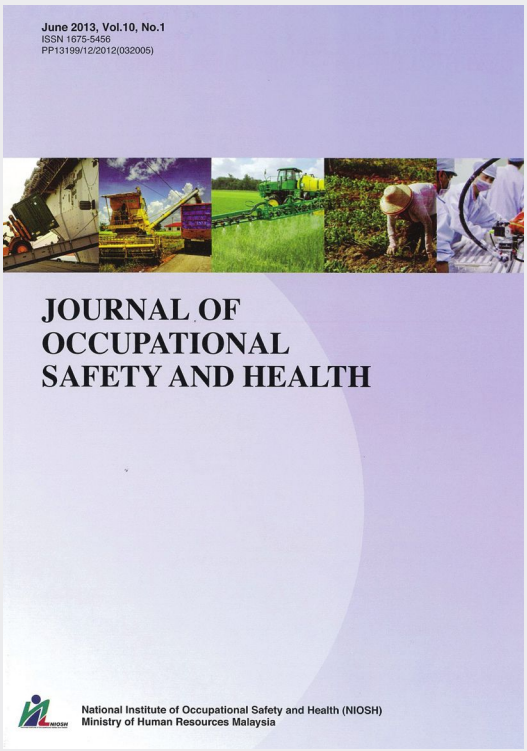

Abstract

Maritime transportation is very important for coastal state country like Malaysia. However, as having the busiest straits in the world, Malaysia is continuously exposed to the risk of marine spill. The nation had experienced around 30 marine spill incidents since 1976 to the present. The main contributor of marine spill is ship's accident and in term of category of accident, collision had contributed the most. In term of type of substance that mostly spilled by ships is highly persistence crude oil. The management of marine spill response of Malaysia is applying the three tiers system which is base on the area and scale of the spill. The basis of establishing the marine response service is in accordance with OPRC, which incorporated into the national environmental law. With the three tiers of response system, Malaysia is equipped with arsenal of marine spill response and control equipments. However, with the present magnitude of threat, the current capacities of equipments are insufficient. Nevertheless, the possibility of full magnitude of marine spill is unlikely due to the safety features incorporated into the design of the ships and FSO/ FPSO. In term of claim and compensation for marine spill incident, Malaysia is applying the two layers of compensation under the CLC 1992 Protocol and FUND 1992 Protocol. Therefore, Malaysia is ready in various aspects of marine spill response and control.

For Full Paper, please find:

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