Proactive Action With The Original Power

HOW TO PREVENT, RESPOND TO ENVIRONMENTAL INCIDENTS NATIONWIDE TIMELY AND SUCCESSFULLY

LESSONS FROM PRACTICES

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VIETNAM ENVIRONMENTAL INCIDENT RESPONSE CENTER (SOS)
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The Vietnam Environmental Incident Response Center (SOS) is a special organization that combines practical experiences in response activities with R&D of equipment and materials based on practices to challenge every occurring issue.

- Response to environmental incidents caused by oil and hazmat (**264 incidents as of August 2024**);
- Extensive experiences in incident response activities helped discover shortcomings and limitations related to equipment and response measures;
- Frequent incident response activities are excellent practices for testing, trial, and evaluation of the newly designed or improved equipment;
- Mass production of successfully tested equipment for delivery nationwide.

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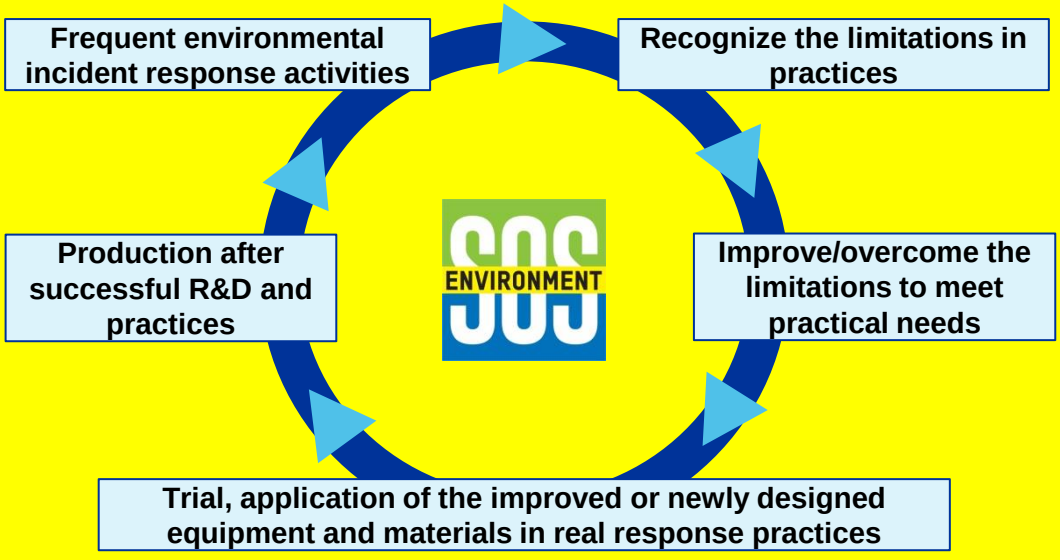


Vietnam Environmental Incident Response Center (SOS) is a member of Vietnam Association for Conservation of Nature and Environment. SOS develops a nationwide network of **more than 100 response stations and points** (by July 2024), equipped with specialized equipment, materials, roadway and waterway vehicles ready for emergency response to any man-made contingency.

The skillful responders dedicated to environmental protection activities, the ability to proactively research and manufacture various equipment and materials for environmental incident response, and the large nationwide network of response stations and points create special advantages for SOS Center in timely, cost-effective, and successful response to more than **260** environmental incidents of various scales and complexities (by August 2024).

"SOS ENVIRONMENT"

Mobile app for emergency notification of environmental incidents

STRATEGIC RESPONSE STATION IN HA NOI CITY

STRATEGIC RESPONSE STATION IN DA NANG CITY

STRATEGIC RESPONSE STATION IN HO CHI MINH CITY

SOME PICTURES OF THE RESPONSE STATIONS & POINTS IN CITIES, PROVINCES

Quang Ninh

Thanh Hoa

Da Nang

Ho Chi Minh

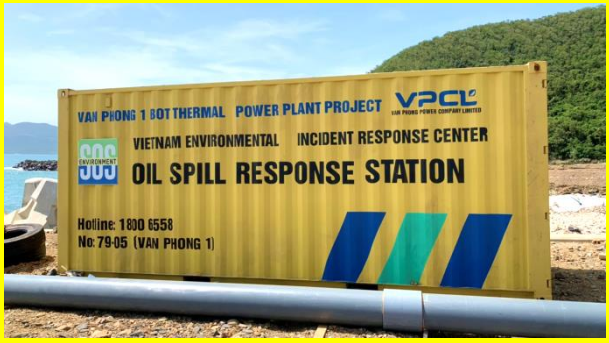
Ba Ria – Vung Tau

An Giang

Dong Nai

Binh Duong

SOME MOBILE RESPONSE POINTS FOR PROJECTS



OIL/FUEL, HAZMAT SPILL RESPONSE VEHICLES

Roadway

Waterway


09


TRUNG TÂM ỨNG PHÓ SỰ CỐ MÔI TRƯỜNG VIỆT NAM (SOS)

SKILLFUL RESPONDERS

EMERGENCY RESPONSE ACTIVITIES

264 incidents (by August 2024)

As of July 2024, SOS Center has responded successfully to 264 oil/chemical incidents in many localities across the country, such as Hanoi, Vinh Phuc, Hoa Binh, Hai Phong, Quang Ninh, Nam Ha, Thai Binh, Ninh Binh, Thanh Hoa, Nghe An, Ha Tinh, Quang Tri, Binh Thuan, Dak Lak, Binh Duong, Binh Phuoc, Dong Nai, Ba Ria - Vung Tau...

Some SOS‘s activities in emergency response to environmental incidents and environmental restoration in the next pages

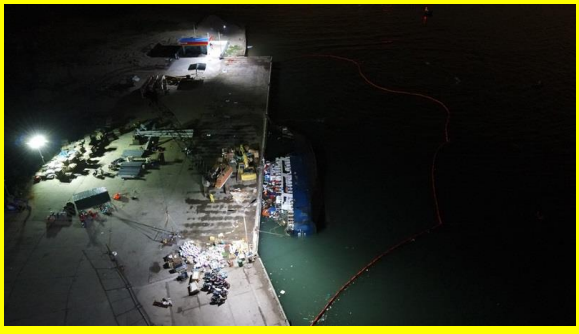
Prevention and response to oil pollution from the drifted ship

“King Rich” ship drifted and was stranded in Cu Lao Cham, Hoi An city, Quang Nam province. Pollution treatment activity to prevent negative impact to sensitive areas

Prevention and response to oil pollution from the sunk ship

Proactive prevention and response to diesel and hazmat spills from the sinking vessel “Giang Anh 18” the susceptible world’s biosphere area Cu Lao Cham, Hoi An city, Quang Nam province

Response activities to oil spills of sinking boats at ports



Ship sank at Thuong Chanh General Port, Phan Thiet city, Binh Thuan province

Ship sank at Tuan Chau International Passenger Port, Ha Long city, Quang Ninh province

Response activities to oil spills of sinking boats at ports

Ship sank at Tho Quang Fishing Port, Son Tra, Da Nang City

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Response activities to incidents in waterway traffic

A huge oil spill caused by collision between an oil tanker and a sand barge on Kinh Thay river, Hai Duong province. There was no any response facilities, the ship crew used woolen blankets for "response".

Response activity at a length of 4 km on the river

Response to oil spills for fishing farms

Oil spill caused by waterway traffic accident hit more than 1,000 fish cages on Kinh Thay river, Nam Sach district, Hai Duong province. Special measures applied for recovery of floating spilled oil, filtering submerged oil particles and safe clean-up oil contaminants

Response to oil spills for fishing farms

Applying environmentally friendly mechanical and biological treatment methods in sensitive areas

Response to oil spills for fishing farms

Applying environmentally-friendly mechanical and biological treatment methods in sensitive areas

Incident response at cement factories



A huge FO spill was caused by the latent defect of the heatproof pipeline under high pressure.

Recovery, clean-up, treatment of FO contaminants on surfaces, in soil, underground, at the ports, river with a total area of 20 ha

Incident response at industrial parks

Incident response at transformer stations

Oil spill from 220KV transformer station, Chau Thanh district, Hau Giang province. Response activities on large agricultural area

Hazmat spill response activities

Chemical drums falling while lifting onto a ship at a port in Ba Ria – Vung Tau province

Hazmat spill response activities

Drums containing acid liquids in the 40-foot container shipped onboard broke, causing acid to spill out from the container and pour on the other containers from the top down, endangering the goods shipped onboard and the ship's hull.
(Cai Mep Port, Phu My town, Ba Ria – Vung Tau province)

Hazmat fire & spill response activities

Responding to a fire and spill incident with a 35% hydrochloric acid tank by encapsulating and fast cooling agent (Seaport in District 7, Ho Chi Minh City, Vietnam)

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Nitric Acid spill response activities

Huge spill of 20 tons of Nitric Acid (HNO3 68%).
Reason: the acid tanks were placed vertically on each other. Unattentive acid leakage silently corroded the metal frame of the bottom tank. It could not bear the heavy weight of the above tanks and caused collapse with the tanks placed on it and nearby it.

C-PEC Encapsulator Agent was applied as an ideal solution for immediately encapsulating toxic gases and vapours to save personnel working in the industrial zone and people in large areas, especially when the responders from the Vietnam Environmental Incident Response Center arrived at the scene to enter the dangerous space for responding.

Acis Nitric spill response activities

The muiti-functioned skimmer system SOSE-2, a unique apparatus that can withstand aggressive chemicals, was used to recover large volumes of spilt Acid liquid.

The recovered acid was temporarily stored in the portable, self-erecting open-top tanks.

Acid liquid recovery by SOSE-2 occurred simultaneously with immediate action to close the drainage, preventing acid liquid from flowing into the water environment.

Clean-up HAZSORB and Kleen HAZO that were used for acid absorption and neutralisation for disposal as per regulations

Mixed incident (fire and explosion) response



Hundred cubic meters of firefighting water washed out unburned lubricant from exploded drums to ground, drainages, river…

Emergency response activities to toxic gases by encapsulating agents, pollution on surfaces, in soil, drainages, river; pollution clean-up by bioremediation

Mixed incident (natural & man-made) response

Heavy rains during hurricanes flooded and isolated Cam Pha city, Quang Ninh province. At this petrol station, one underground tank unfilled with diesel became a "pontoon" due to unqualified construction. A few tons of concrete above were unable to keep the "pontoon" underground. Flood pushed it up to the surface, breaking its pipelines and the pipelines of all other underground tanks. Mixed spilled gasoline – diesel – kerosene flowed to citizens' houses in the local district.

As this area was isolated, response facilities were difficult to mobilize from other localities. Thanks to the available equipment and supplies from the nearby SOS response station, the incident was responded to timely and successfully.

Images of the underground tank after the flood finished

Mixed incident (fire, explosion, storm) response



The 500KV transformer station in Hoa Binh province caught fire and exploded. Firefighting water and heavy rain washed out large amounts of spilled oil from the mountain, contaminating a large area of ground, gardens, roads and underground

Emergency response activities at midnight to minimize transformer oil penetrating deep into the ground and clean up contaminated roads. Bioremediation wherever mechanical method was impossible

Mixed incident (fire, explosion, storm) response

Overcoming oil pollution after a fire at a 500kV transformer station

Mixed incident (fire, explosion, storm) response

Overcoming oil pollution after a fire at a 500kV transformer station

Gasoline-polluted soil and groundwater remediation

Broken underground oil tank at a petrol station, Cam My district, Dong Nai province, causing widespread pollution of groundwater and well water

Gasoline-polluted soil and groundwater remediation

Broken underground oil tank of a petrol station, causing widespread soil, groundwater, and well water pollution, Huong Khe district, Ha Tinh province

Gasoline underground pipeline explosion response

An underground gasoline pipeline (2 km length) exploded at high pressure. Gasoline rised up from underground and spread over the large rice fields and lakes. High concentrated gasoline vapor might cause fire & explosion risk and endanger people nearly.
Special response measures were applied, and then environmental restoration by bioremediation.

Gasoline-polluted soil and groundwater remediation



The underground gasoline tank at the petrol station broke due to severe rust on the tank wall. Underground water seriously polluted in the large area (Yen Bai province)

Gasoline-polluted well water remediation by a combination of encapsulator agents and bioremediation for many families in the villages

Diesel spill response and soil remediation

Oil spill caused by an oil tanker accident on the road polluted more than 2 hectares of agricultural land in Hoa Lu district, Ninh Binh province

Bioremediation for 2 ha of the agricultural fields

Incident response and environmental restoration




Diesel spill caused by a broken bottom discharge valve of the tank at a military petroleum depot, Quang Hung ward, Thanh Hoa province

Mechanical and biological treatment methods




BEFORE

AFTER









Incident response and environmental restoration

An oil spill occurred at Thach Thanh petrol station in Ha Tinh province. The oil flowed into the ditch and entered the rice fields. Emergency response and environmental restoration: Before and After

Oil contamination response and treatment at clean water supply factory in mountainous area

The water input of Song Da Water Plant, Hoa Binh province was contaminated with waste oil, which greatly affected lives and health of millions of people in Hanoi city…

Oil contamination response and treatment at clean water supply factory in mountainous area

Special oil filtering curtains secured millions people in Hanoi

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Preventing fire, explosion and oil spill incidents at Danang International Fireworks Festival - DIFF 2023 & 2024, Da Nang city

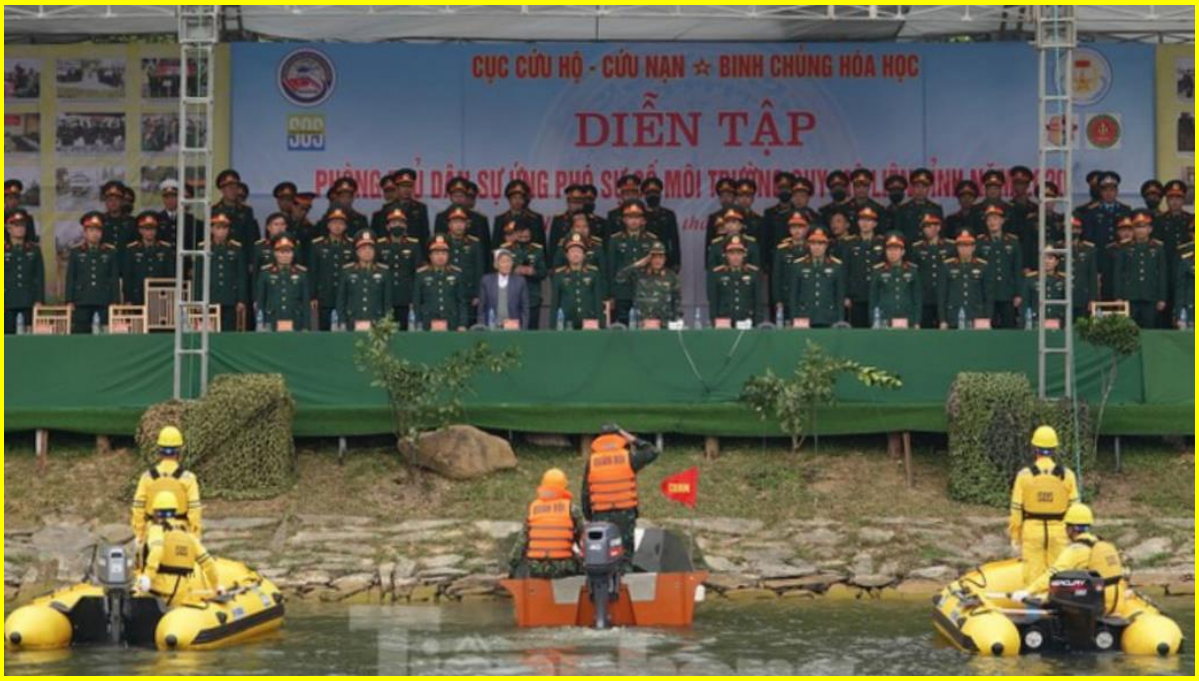
Preventing and responding to fire, explosion and oil spill incidents at Vietnam Offroad PVOIL Cup

INCIDENT RESPONSE TRAININGS AND DRILLS

>700 courses (by July 2024)

Organizing, or coordinating in education, training, drills for responders for prevention and response to oil spills, hazmat incidents, civil defense at different levels

Inter-provincial civil defense and environmental incident response drill (coordinated with Vietnam Chemical Command)



Provincial oil spill response drills (coordinated with local governments)

Search, rescue and oil spill response drill at sea (coordinated with Vietnam Border Guard)

Search, rescue and oil spill response drill at sea (coordinated with Vietnam Border Guard)

Oil spill response & fire prevention and fighting drill

Chemical spill response drill

Oil spill response drill at petroleum depot

Basic training practice

Sharing incident response experiences with other countries

CONSULTING ON INCIDENT PREVENTION AND RESPONSE PLANS

>400 projects (by July 2024)

International projects:
Assessment of the situation and recommendations for alternative solutions to reduce the impact of open burning and pesticide use in agriculture on climate change, human health, and biodiversity in Vietnam

Ministerial projects:
Develop an action plan with comprehensive incidents/emergency response and guidance on the emergency response of PCB emission incidents (National PCB Management Project of VEA, Ministry of Natural Resources and Environment).
Develop training materials and plans for some local authorities selected to perform environmental incident prevention and response related to POPs, PCBs, and other toxic chemicals.

Provincial projects:
Consulting provincial oil/chemical spill response plans and sensitive maps for Hanoi, Bac Ninh, Quang Ninh, Thai Binh, Nghe An, Ha Tinh, Quang Binh, Quang Tri, Quang Nam, Binh Dinh, Tien Giang, Ca Mau, Ba Ria – Vung Tau, Ha Nam, Ben Tre, Binh Duong….

Grassroots projects: More than 300 projects of developing oil/chemical spill prevention and response plans for businesses nationwide.

PRODUCTION AND SUPPLY OF ENVIRONMENTAL INCIDENT PREVENTION AND RESPONSE EQUIPMENT

SOS Center produces more than 120 specialized equipment and materials for incident response and environmental restoration, using its own design, and supplies them to responders nationwide.
SOS Center is a special organization that combines rich practical experience in response activities with the production of equipment and materials after R&D-based practical experience.

Some specialized response equipment and supplies designed to meet specific local requirements in the next pages

SOME SPECIALIZED RESPONSE EQUIPMENT & MATERIALS

Oil-chemical skimmer system

6-in-1 multi-purpose equipment:

1. Skim spilled oil/chemical
2. Vacuum spilled oil on water surface
3. Suction liquids in drainages, sewers
4. Vacuum liquids on hard surfaces
5. Wash with high-pressure water spray
6. Spray toxic gas

Oil filtering containment boom

Dual–purpose boom:

1) To contain floating spilled oil (as all regular oil containment booms)

2) To filter and contain oil particles submerged, dispersed in water due to waves, currents, wind, or weathering (but allowing water to come through quickly).

It is a unique solution for treating daily oil pollution such as oil/fuel leaks from petroleum terminals, petrol stations, factories, industrial parks… flowing down drains into lakes, rivers… and for prevention and proactive response to oil spill 24/7.

Hexagonal temporary storage tank

The hexagonal temporary storage tank is used to store oil/fuel or liquid chemicals that need to be recovered in oil, chemical spills or leaks. It is manufactured with specialized materials with high durability. The tank is designed to be easily folded, occupy a small volume so making it easy to store in narrow spaces.

Open - top temporary storage tank

The open-top temporary storage tank is a portable, self-erecting open-top reservoir for temporary storage of all types of liquids, suitable for many different applications such as oil/chemical emergency response and industrial and civil use. The tank can be used to temporarily store large amounts of oil/chemical contaminated water collected from the process of oil/chemical/industrial waste spill recovery or store water for firefighting, civil construction, etc, and bulk storage of other liquids.

The product is an ideal alternative to conventional storage tanks/drums, which have many limitations such as being heavy, bulky, and unable to be equipped with vehicles. It is also a solution to overcome difficulties in mobilizing storage vehicles to the scene, especially in remote or hard-to-reach areas.

Floating temporary storage tank

In oil/chemical spill response activities on rivers and seas, or in other offshore locations, it is extremely important to ensure to have tanks to contain pollutants during the recovery process promptly.

If adequate storage equipment is not guaranteed, oil/chemicals will escape into the water environment, causing serious and long-term consequences for the environment and humans.

To minimize unpredictable dangers to the environment due to oil/chemical spills on water and offshore locations, SOS has researched and developed floating temporary storage tanks with different storage capacities, simple to be deployed, towed and moved on the water by boats/canoes.

The tank is made from highly durable materials, resistant to oil, chemical, easily folded for storage.

Mobile oil filtering module

SOS-T3 is made of SUS304 and has a lightweight and compact structure. It is easy to transport to hard-to-reach locations by common vehicles such as motorbikes, canoes, small boats, or by hands.

The frame system design combined with specialized filtering layers optimizes the ability to filter oil from wastewater with a fast flow rate of up to 30 m3/hour, meeting the requirement for quick treatment of large volumes of oil-contaminated water generated during emergency oil spill response.

Operating this device is very simple. Oil contaminated water is pumped or poured from outside then oil is separated by a system of filtering layers inside. There are no motorized parts so the maintenance is easy.

Nano oil – chemical absorbent materials

Nano oil-chemical absorbent materials are manufactured by advanced Japanese technology with microscopic nano-sized fibers, thus having outstanding ability to absorb and retain liquids. Products are designed in a variety of shapes and sizes, suitable for many different applications.

HAZ-SORB absorbent and neutralizing powder

HAZ-SORB chemical absorbent and neutralizing powder is specialized for quickly absorbing, neutralizing and cleaning chemical solutions when spills or leaks occur in warehouses, workshops, factories and ports related to storage, transportation, and use of chemicals.

The product is made from natural inorganic mineral materials, safe for human and the environment.

HAZO deodorizer

A product of **Encapsulator Technology** with main functions:

- Eliminating odors, gases, smoke, toxic vapors;
- Cleaning fine dust and toxic chemicals on surfaces…

It is commonly used to respond to incidents involving toxic gases caused by fires or chemical spills.

C-PEC encapsulator agent

C-PEC is a specialized solution for cleaning oil spills on the surface and underground, treating oil-contaminated soil and groundwater when combined with Bio-HAZO.

Key features: Fuel encapsulation and neutralization, Rapid heat reduction, Fire suppression, Eco-friendly.

Bio HAZO oil absorbent- bioremediation agent

A dual-purpose agent:

1) To absorb hydrocarbon liquids, encapsulate it without leaching back to the environment

2) To biodegrade encapsulated hydrocarbons by “oil-eating” microorganisms, converting toxic substances into carbon dioxide and water.

For on-site treatment of oil-contaminated sand, soil, rocks, river banks, beaches, etc.

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