SEA (INDIA)

INDIAN SAFETY ENGINEER

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FROM THE DESK OF PRESIDENT

Dear Members,

In the last quarter, our 52nd Executive Committee meeting was held on 23rd October 2010. 25th Technical Meet was held on 18th December 2010. Our journal "Indian Safety Engineer" for the third quarter 2010 was released in time and hopefully the next one will also reach you soon, and in time. As our contribution to the young engineers who coming up in life, Safety Awareness Lectures were extended to a few colleges and the response and feedback from the educational institutions are good and encouraging.

SEA website, **www.seaindia.org** now looks much better. The site now provides links for new members to forward their applications on line. The service provider is advised to periodically update the contents. Members may forward their feedback and suggestions on the site.

SEA India Group mail under Yahoo Groups of Emails is now getting activated and more than 100 email IDs are enrolled.

Library at the office premises now has good collection of reference books and members are advised to visit the office and make use of them. Members who have useful reading materiel can also donate them for the benefit of other members.

Seventh batch of Nebosh IGC course was conducted and exams were held in early December 2010. Enrollment for the next batch of the course due in March 2011 is almost completed and if the demand continues, we may have to consider two parallel classes in the same batch

I am pleased to share with you that a kick off meeting was held recently at Mumbai by a group of safety engineers towards forming the Mumbai Chapter of SEA (India). It is our endeavor to grow steadily and promote professionalism in all possible ways.

One more year is coming to an end and SEA is getting nearer to a decade old. Wishing you and your Near & Dear a Happy New Year and Seasons Greetings!!

Best Wishes!

S. Ulaganathan
President, SEA India

Inside....

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24th Technical Meet

24th Technical Meet was held on Saturday, 9th October, 2010 at Chennai. Dr Prof M Krishnan, Head of Eco Bio Technology Department., Bharathidasan University, Tiruchirapalli delivered the talk on **"Global Warning & Climate Change".**

Large number of SEA Members participated in the Technical Meet.

25th Technical Meet

25th Technical meet was held on Saturday, 18th December, 2010 at Sri Ramachandra University, Porur, Chennai. Prof. Dr. Med. Dieter Borgers RMD, MPH of Heinrich-Heine-University, Duesseldorf, Germany delivered the talk on "Consequences of Health Aspects in Non-Standard and Night Shift Work".

Mr. S. Ulaganathan, President, SEA India presented a memento to Dr. Dieter Borgers.

GLOBAL WARMING & CLIMATE CHANGE

The salient points discussed during the 24th Technical Meet by Dr. Prof. M. Krishnan are given in a nutshell:

What is climate change?

- Climate change is a change in the statistical distribution of weather over periods of time that range from decades to millions of years.
- It can be a change in the average weather or a change in the distribution of weather events around an average (for example, greater or fewer extreme weather events).
- Climate change may be limited to a specific region, or may occur across the whole Earth.
- The term sometimes is used to refer specifically to climate change caused by human activity; for example, the United Nations Framework Convention on Climate Change defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods."

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24th Technical ....

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Imperative Causes for Climate Change

Factors that can shape climate are climate forcings.

There are a variety of climate change feedbacks that can either amplify or diminish the initial forcing.

Some parts of the climate system, such as the oceans and ice caps, respond slowly in reaction to climate forcing because of their large mass.

Therefore, the climate system can take centuries or longer to fully respond to new external forcings.

- Since the middle of the 20th century, Australian temperatures have, on average, risen by about 1°C with an increase in the frequency of heatwaves and a decrease in the numbers of frosts and cold days.
- Rainfall patterns have also changed - the northwest has seen an increase in rainfall over the last 50 years while much of eastern Australia and the far southwest have experienced a decline.

What Causes Climate Change?

- Natural Causes of Climate Change
- Human Causes of Climate Change

Natural Causes of Climate Change

- Volcanic eruptions
- Ocean current
- Earth orbital changes
- Solar variations

Human Causes of Climate Change

- Burning of fossil fuels (coal, oil, and natural gas)
- Deforestation
- Industrialization
- Emissions from automobile

Effects of Climate Change

- Sea level rising
- Melting of glacier
- Sea-surface temperatures are warming
- Heavier rainfall cause flooding in many regions
- Extreme drought is increasing
- Ecosystems are changing

Effects of Temperature Rise on Dengue Transmission

- Shorten viral incubation period in mosquito
- Shorten breeding cycle of mosquito
- Increase frequency of mosquito feeding
- More efficient transmission of dengue virus from mosquito to human

Acid rain and it effects

- Soil – The acidity of the soil increases.
- Trees – Stunted growth, chlorosis, Necrosis.
- Lakes and Water – Increases the acidity and affects the marine ecosystem.
- Buildings are Damaged.
- Health – Causes breathing problem and leads to cancer.

How to reduce the Green House Gases....?

- Reduce CO_2 Emissions!
- Clean Electricity / Alternative Energy
- Smart Transportation and Land Use
- Healthy Farms and Forests
- Promote Conservation / Restoration
- Make Greener Choices

How to reduce the Global Warming?

Reduce

- The amount of energy you consume and start using renewable energy sources, such as wind power and solar power. Sign up for Green Energy with your local power provider. If they don't have it, then tell them to get it.

Reuse

- By using products made with recycled materials. Make or buy a compost bin to use your organic waste as fertilizer for your trees, shrubs, and garden.

Recycle

- All materials to your best ability in your local area. ■

DIOXINS AND THEIR EFFECTS ON HUMAN HEALTH

Key Facts

- Dioxins are a group of chemically-related compounds that are persistent environmental pollutants.
- Dioxins are found throughout the world in the environment and they accumulate in the food chain, mainly in the fatty tissue of animals.
- More than 90% of human exposure is through food, mainly meat and dairy products, fish and shellfish. Many national authorities have programmes in place to monitor the food supply.
- Dioxins are highly toxic and can cause reproductive and developmental problems, damage the immune system, interfere with hormones and also cause cancer.
- Due to the omnipresence of dioxins, all people have background exposure, which is not expected to affect human health. However, due to the highly toxic potential of this class of compounds, efforts need to be undertaken to reduce current background exposure.
- Prevention or reduction of human exposure is best done via source-directed measures, i.e. strict control of industrial processes to reduce formation of dioxins as much as possible.

Background

Dioxins are environmental pollutants. They have the dubious distinction of belonging to the "dirty dozen" - a group of dangerous chemicals known as persistent organic pollutants. Dioxins are of concern because of their highly toxic potential. Experiments have shown they affect a number of organs and systems. Once dioxins have entered the body, they endure a long time because of their chemical stability and their ability to be absorbed by fat tissue, where they are then stored in the body. Their half-life in the body is estimated to be seven to eleven years. In the environment, dioxins tend to accumulate in the food chain. The higher in the animal food chain one goes, the higher the concentration of dioxins.

The chemical name for dioxin is: 2,3,7,8- tetrachlorodibenzo para dioxin (TCDD). The name "dioxins" is often used for the family of structurally and chemically related polychlorinated dibenzo para dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). Certain dioxin-like polychlorinated biphenyls (PCBs) with similar toxic properties are also included under the term "dioxins". Some 419 types of dioxin-related compounds have been identified but only about 30 of these are considered to have significant toxicity, with TCDD being the most toxic

Sources of dioxin contamination

Dioxins are mainly by products of industrial processes but can also result from natural processes, such as volcanic eruptions and forest fires. Dioxins are unwanted by products of a wide range of manufacturing processes including smelting, chlorine bleaching of paper pulp and the manufacturing of some herbicides and pesticides. In terms of dioxin release into the environment, uncontrolled waste incinerators (solid waste and hospital waste) are often the worst culprits, due to incomplete burning. Technology is available that allows for controlled waste incineration with low emissions.

Effects of dioxins on human health

Short-term exposure of humans to high levels of dioxins may result in skin lesions, such as chloracne and patchy darkening of the skin, and altered liver function. Long-term exposure is linked to impairment of the immune system, the developing nervous system, the endocrine system and reproductive functions. Chronic exposure of animals to dioxins has resulted in several types of cancer. TCDD was evaluated by the WHO's International Agency for Research on Cancer (IARC) in 1997. Based on animal data and on human epidemiology data, TCDD was classified by IARC as a "known human carcinogen". However, TCDD does not affect genetic material and there is a level of exposure below which cancer risk would be negligible.

Due to the omnipresence of dioxins, all people have background exposure and a certain level of dioxins in the body, leading to the so-called body burden. Current normal background exposure is not expected to affect human health on average. However, due to the

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ELECTROSTATIC PRECIPITATOR

An electrostatic precipitator (ESP), or electrostatic air cleaner is a particulate collection device that removes particles from a flowing gas (such as air) using the force of an induced electrostatic charge. Electrostatic precipitators are highly efficient filtration devices that minimally impede the flow of gases through the device, and can easily remove fine particulate matter such as dust and smoke from the air stream. In contrast to wet scrubbers which apply energy directly to the flowing fluid medium, an ESP applies energy only to the particulate matter being collected and therefore is very efficient in its consumption of energy (in the form of electricity).

The plate precipitator

The most basic precipitator contains a row of thin vertical wires, and followed by a stack of large flat metal plates oriented vertically, with the plates typically spaced about 1 cm to 18 cm apart, depending on the application. The air or gas stream flows horizontally through the spaces between the wires, and then passes through the stack of plates.

A negative voltage of several thousand volts is applied between wire and plate. If the applied voltage is high enough an electric (corona) discharge ionizes the gas around the electrodes. Negative ions flow to the plates and charge the gas-flow particles.

The ionized particles, following the negative electric field created by the power supply, move to the grounded plates.

Particles build up on the collection plates and form a layer. The layer does not collapse, thanks to electrostatic pressure (given from layer resistivity, electric field, and current flowing in the collected layer).

Collection efficiency (R)

Precipitator performance is very sensitive due to two particulate properties: 1) Resistivity; and 2) Particle size distribution. These properties can be determined economically and accurately in the laboratory. A widely taught concept to calculate the collection efficiency is the Deutsch model, which assumes infinite remixing of the particles perpendicular to the gas stream.

Resistivity can be determined as a function of temperature in accordance with IEEE Standard 548. This test is conducted in an air environment containing a specified moisture concentration. The test is run as a function of ascending or descending temperature or both. Data are acquired using an average ash layer electric field of 4 kV/cm. Since relatively low applied voltage is used and no sulfuric acid vapor is present in the environment, the values obtained indicate the maximum ash resistivity.

Usually the descending temperature test is suggested when no unusual circumstances are involved. Before the test, the ash is thermally equilibrated in dry air at 454 °C (850°F) for about 14 hours. It is believed that this procedure anneals the ash and restores the surface to pre-collection condition.

If there is a concern about the effect of combustibles, the residual effect of a conditioning agent other than sulfuric acid vapor, or the effect of some other agent that inhibits the reaction of the ash with water vapor, the combination of the ascending and descending test mode is recommended. The thermal treatment that occurs between the two test modes is capable of eliminating the foregoing effects. This results in

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Guidance on ....

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high toxic potential of this class of compounds, efforts need to be undertaken to reduce current background exposure

Prevention and control of dioxin exposure

Proper incineration of contaminated material is the best available method of preventing and controlling exposure to dioxins. It can also destroy PCB-based waste oils. The incineration process requires high temperatures, over 850°C. For the destruction of large amounts of contaminated material, even higher temperatures - 1000°C or more - are required.

Prevention or reduction of human exposure is best done via source-directed measures, i.e. strict control of industrial processes to reduce formation of dioxins as much as possible. ■

Electrostatic ....

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ascending and descending temperature resistivity curves that show a hysteresis related to the presence and removal of some effect such as a significant level of combustibles.

With particles of high resistivity (cement dust for example) Sulfur trioxide is sometimes injected into a flue gas stream to lower the resistivity of the particles in order to improve the collection efficiency of the electrostatic precipitator .

Modern industrial electrostatic precipitators

ESPs continue to be excellent devices for control of many industrial particulate emissions, including smoke from electricity-generating utilities (coal and oil fired), salt cake collection from black liquor boilers in pulp mills, and catalyst collection from fluidized bed catalytic cracker units in oil refineries to name a few. These devices treat gas volumes from several hundred thousand ACFM (Actual Cubic Feet per Minute) to 2.5 million ACFM (1,180 m^3/s) in the largest coal-fired boiler applications. For a coal-fired boiler the collection is usually performed downstream of the air preheater at about 160 °C (320 deg.F) which provides optimal resistivity of the coal-ash particles. For some difficult applications with low-sulfur fuel hot-end units have been built operating above 371 °C (700 deg.F).

The original parallel plate–weighted wire design (described above) has evolved as more efficient (and robust) discharge electrode designs were developed, today focusing on rigid (pipe-frame) discharge electrodes to which many sharpened spikes are attached (barbed wire), maximizing corona production. Transformer-rectifier (TR) systems apply voltages of 50–100 kV at relatively high current densities. Modern controls, such as an automatic voltage control, minimize sparking and prevent arcing (sparks are quenched within 1/2 cycle of the TR set), avoiding damage to the components. Automatic plate-rapping systems and hopper-evacuation systems remove the collected particulate matter while on line, theoretically allowing ESPs to stay in operation for years at a time.

Wet electrostatic precipitator

A wet electrostatic precipitator (WESP or wet ESP) operates with saturated air streams (100% relative humidity). WESPs are commonly used to remove liquid droplets such as sulfuric acid mist from industrial process gas streams. The WESP is also commonly used where the gases are high in moisture content, contain combustible particulate, have particles that are sticky in nature. The preferred and most modern type of WESP is a downflow tubular design. This design allows the collected moisture and particulate to form a slurry that helps to keep the collection surfaces clean.

Plate style and upflow design WESPs are very unreliable and should not be used in applications where particulate is sticky in nature.

Consumer-oriented electrostatic air cleaners

Plate precipitators are commonly marketed to the public as air purifier devices or as a permanent replacement for furnace filters, but all have the undesirable attribute of being somewhat messy to clean. A negative side-effect of electrostatic precipitation devices is the production of toxic ozone and NO_x. However, electrostatic precipitators offer benefits over other air purifications technologies, such as HEPA filtration, which require expensive filters and can become "production sinks" for many harmful forms of bacteria.

The two-stage design (charging section ahead of collecting section) has the benefit of minimizing ozone production which would adversely affect health of personnel working in enclosed spaces. For shipboard engine rooms where gearboxes generate an oil fog, two-stage ESP's are used to clean the air improving the operating environment and preventing buildup of flammable oil fog accumulations. Collected oil is returned to the gear lubricating system.

With electrostatic precipitators, if the collection plates are allowed to accumulate large amounts of particulate matter, the particles can sometimes bond so tightly to the metal plates that vigorous washing and scrubbing may be required to completely clean the collection plates. The close spacing of the plates can make thorough cleaning difficult, and the stack of plates often cannot be easily disassembled for cleaning. One solution, suggested by several manufacturers, is to wash the collector plates in a dishwasher.

Some consumer precipitation filters are sold with special soak-off cleaners, where the entire plate array is removed from the precipitator and soaked in a large container overnight, to help loosen the tightly bonded particulates.

It is believed that ESP filters provided the best, and most cost-effective means of cleaning air using a forced-air system. ■

GREEN TEA – A WONDER DRINK!

The benefits of green tea and its effects were discovered 4,000 years ago and since then it has been considered a wonder drink!

Green tea acts as an antiviral agent. It contains fluoride, a mineral that helps prevents cavities and strengthens tooth enamel. A cup a day can help reduce plaque formation and bacterial infections in the mouth. It acts as an anti-inflammatory, maintains a healthy, active metabolism and circulatory system just to name a few. This proves that this drink is indeed a miracle in a cup!

Your body responds to the negative effects of free radicals by utilizing defensive antioxidant molecules present in your systems in order to detoxify these harmful effects.

This is the reason why you are being encouraged by nutritionists and other health professionals to increase the levels of antioxidants in your body.

Luckily, this is easily achieved by simply adding nutritious foods in your diet such as fruits and vegetables that are naturally rich in antioxidants.

The antioxidant levels of green tea is hundred times more effective than vitamin C and twenty-five times better than vitamin E in protecting our immune systems. Another great reason to drink several cups everyday.

The green tea ingredients are the ones responsible for its amazing health benefits. They are called catechins!

Catechins are considered the most effective of all antioxidants and the amounts as well as the effects are far higher compared to black tea. The fact that green tea undergoes less internal changes from fresh leaf means that it contains the largest quantity of intact catechins.

Asian population are experiencing its wonderful effects and benefits. Statistics have shown that Asians have a lower risk of acquiring diseases because of their healthy lifestyle.

One of the health benefits of green tea is it's potential to act as a protective agent against premature death from heart disease and cancer.

Drinking this tea is said to lower the levels of total cholesterol and LDL-cholesterol, thereby reducing platelet aggregation, and helping to keep blood pressure in check.

Other health benefits of green tea are the following:

- fights against cancer
- helps stabilize diabetes
- prevents cardiovascular disease
- it keeps your skin acne-free, making it healthier and prettier
- assists in weight loss regimen
- slows the aging process
- aids your digestion
- encourages bowel regularity
- provides you with a mild stimulating effect without causing sleepless nights or nervousness especially during pregnancy

You can do a lot of things with this wonder drink. Did you also know that the health benefits of green tea are not only confined to drinking but you can also medicate with it? What else does it do? You can even cook with green tea or use the leftover liquor to water your plants, and keep your cat's litter box fresh and pleasant smelling.

These powerful benefits cannot be compared to any other substance in the world without a single side effect. ■

TAKE CARE WITH ACETYLENE

Acetylene cylinder explosion

An operator was lighting an oxy/acetylene cutting torch. There was a flashback to the acetylene cylinder, which started to vibrate. Three minutes later the cylinder exploded. The cylinder split into two parts. The largest part shot through a window and travelled 23 metres before embedding itself in an embankment at the factory boundary.

The workshop was badly damaged. The windows were blown out and the roof collapsed. The explosion also lifted the roof of the main factory building, which had to be replaced with heavy cost.

Fortunately, no-one was injured, because the operator realised that the cylinder was in a dangerous condition. He raised the alarm and the factory was immediately evacuated.

What went wrong?

Acetylene is an extremely flammable gas. It is different from other flammable gases because it is also unstable. Under certain conditions, it can decompose explosively into its constituent elements, carbon and hydrogen.

The operator did not fully appreciate the hazards of acetylene. He did not follow the recommended procedures or take adequate precautions .

- The correct lighting up procedure was not followed. The gas hoses were not purged.
- The acetylene gas was not at the correct pressure.
- The gas cylinders were not protected with flashback arresters.

A flashback can occur…if there is a flammable mixture of fuel gas and oxygen in the hoses when the torch is lit. If it is not stopped, the flame will ignite the mixture and will travel backwards from the torch, along the hoses, through the regulator and into the cylinder. A flashback can trigger decomposition of the acetylene in the fuel hose, in the regulator and in the cylinder itself .

Hazards of acetylene cylinders

There are a number of incidents, where a flashback into an acetylene Cylinder triggers decomposition, leaving the cylinder in a dangerous, unstable condition. An explosion of the cylinder only three minutes after a flashback is extremely rare. In most cases, if the decomposition is identified at an early stage, there is time for the building to be evacuated, the fire brigade to be called and for emergency action to be taken.

To make an unstable cylinder safe, the fire brigade may have to apply cooling water for many hours. It could be several days before the cylinder can be moved, because moving the cylinder could restart or accelerate the decomposition.

These incidents put at risk anyone in the vicinity of the cylinder and anyone who tries to make the cylinder safe, such as the emergency services.

Acetylene cylinders can be used safely.

An acetylene cylinder has a different design from most other gas cylinders. It consists of a steel shell containing a porous mass. The porous mass is a cellular structure which completely fills the cylinder. The acetylene gas in the cylinder is dissolved in acetone which is absorbed by the porous mass. Decomposition of the acetylene is usually triggered by heat. For example, if the cylinder is:

- involved in a fire;
- scorched by flames from a blowtorch; or
- involved in a flashback.

The porous mass is designed to slow down or stifle any decomposition of the gas.

From the start of decomposition to the cylinder exploding should take several hours. This will usually (but not always) provide time for emergency action.

Decomposition can be triggered more easily and can proceed more rapidly if:

- the porous mass has been damaged by repeated flashbacks or by mishandling or dropping the cylinder;
- the cylinder valve is leaking gas (an open or leaking valve increases the rate of decomposition within the cylinder); or
- the acetylene in the hoses is above the pressure recommended by the supplier.

For most welding and cutting processes, the acetylene pressure should not exceed 0.62 bar.

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Take care with....

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What can you do to prevent flashback?

- Do not use oxy/acetylene equipment unless you have been trained. Use the correct lighting-up procedures
- Before lighting the blowpipe, purge the hoses by opening the gas supply to each hose for a few seconds. This will flush out any flammable mixtures of gases in the hose. Purge one hose at a time and close the blowpipe valve after purging. Use a well-ventilated area.
- Use a spark ignitor to light the gas.
- Use the correct gas pressures and nozzle sizes for the job

Handle acetylene cylinders with care

- Do not drop or jar them.
- Do not roll them across the floor.
- Keep them in an upright position.

Fit flashback arresters

- Fit flashback arresters onto the pressure regulators on both the acetylene cylinder and the oxygen cylinder.
- For long lengths of hose, fit arresters on both the blowpipe and the regulator.

Note: The fitting of flashback arresters is not a substitute for safe working practices.

Maintain non-return valves

- Fit non-return valves (often called check valves) on the torch, to prevent backfeeding of gas into the hoses.
- Inspect regularly and replace damaged non-return valves.

Note: non-return valves will not stop a flashback once it has occurred. Keep nozzles in good condition.

Poorly maintained nozzles cause turbulent gas flow, which increases the risk of flashback.

- Inspect nozzles regularly. Make sure they are not blocked by dirt or spatter. Replace damaged nozzles.
- Do not hold the nozzle too close to the workplace. The nozzle can overheat and cause a flashback.

If a flashback does occur:

- Immediately close the cylinder valves, both acetylene and oxygen, if it is safe to do so. The flame should go out when the fuel gas (acetylene) is shut off. If the flame cannot be put out at once, evacuate the area and call the emergency fire services and the gas supplier.
- Check any acetylene cylinder which has been involved in a flashback or which may have been affected by fire or flames. If it becomes warm or starts to vibrate, evacuate the building immediately and call the emergency fire services.
- Do not attempt to move an unstable cylinder. Direct water spray at the cylinder body, if it is safe to do so.
- Before using again, check flashback arresters and other components which may have been damaged by the flash-back. Replace if necessary. ■

Vital First Aid Tips for Hand Injuries

Cuts: Put direct pressure on wound and keep injured hand elevated above the shoulder to stop bleedng. Clean up the wound and apply sterile dressing.

Minor Heat Burns: Soak in cold water immediatelyand continue soaking till pain subsides. If the skin is broken, cover with sterlle dressing. Don't apply ointment or grease. Better to seek medical help.

Sprains, Blows: Put on cold compresses to reduce pain and swelling. Get medical help to ascertain the extent of injury and treatment.

Blisters: Leave blistered skin unbroken; avoid further irritation and pressure. Clean up and apply sterile dressing if skin is broken. Get medical help.

Chemical Burns: Flush injured area thoroughly in cool running water for atleast ten minutes to dilute and wash away the chemical. Seek the medical help immediately.

Amputation: Put the amputated limb in an uncontaminated bag of ice and rush the victim with it to the nearest emergency unit of a hospital for treatment.

THE DEEPWATER HORIZON SPILL BY THE NUMBERS

As days stretched into weeks, then weeks into months, BP's Deepwater Horizon wellhead continued to spew millions of gallons of oil into the Gulf of Mexico.

The Leak

4.9 million: Barrels of oil (205.8 million gallons) leaked from the Deepwater Horizon well, about half the amount of crude oil the U.S. imports per day

19: Times more oil leaked from Deepwater Horizon than spilled from the Exxon Valdez in 1989 (10.8 million gallons)

62,000: Barrels leaking per day when the wellhead first broke, roughly the amount of oil consumed in Delaware each day

53,000: Barrels leaking per day when the well was capped on July 15, roughly the amount of oil consumed in Rhode Island each day

397.7 million: Dollars' worth of the oil spilled at current market prices ($81.17 per barrel)

665: Miles of coastline contaminated by oil

The Cleanup

16.5 million: Gallons of oil chemically dispersed by National Incident Command

32.9 million: Gallons of oil naturally dispersed, which means it has broken into droplets smaller than the diameter of a human hair

51.5 million: Gallons of oil evaporated or dissolved. This differs from natural dispersion because instead of breaking down into small droplets, the oil breaks apart molecularly and dissolves into the water.

6.2 million: Gallons of oil skimmed off the Gulf by the more than 830 skimming vessels used in the response

35 million: Gallons directly recovered from the wellhead into ships through the riser pipe and top-hat systems

11.4 million: Gallons of oil has been removed by a series of 411 controlled burns

53.5 million: Gallons of oil still remaining in the water or washed ashore

95.6 million: Potential gallons of gasoline leaked from the wellhead (approximately 19.5 gallons of gas can be derived from one barrel of oil). That's about one-fourth of daily consumption in the United States.

10.4 million: Feet of sorbent boon (8.7 million) and containment boom (2.7 million) currently deployed to contain the oil

1.8 million: Gallons of both surface and subsea dispersant used by Unified Incident Command

28,900: Total number of personnel currently deployed in response to the spill. On July 8, 47,000 people had been deployed.

57,539: Square miles of Gulf waters that remain closed to fishing

In Perspective

184,181: Times you could drive a Toyota Prius (48 mpg highway) around the Earth at the equator using the lost oil

69,068: Times you could drive a Hummer H3 (18 mpg highway) around the Earth

311: Olympic-size swimming pools that could be filled with the oil that leaked from Deepwater Horizon

13,208: Homes that could have been heated for one year (approximately 2 gallons of heating oil are produced from one barrel, with an average American household using 742 gallons per year). ■

CASE STUDY

CASE STUDY 1:
FAILURE TO ASSESS THE RISK

Accident description: A fairly big industry had a boundary wall surrounding the works and stores. Though the security was very tight in the gates, theft was going on, during nights since the wall was only 6 feet high.

The authorities wanted to increase the height of the wall to prevent further loss of material. Instead of raising the wall they wanted to put up 4 feet high barbed wire fencing. The work was awarded to a good contractor.

A gang of people were busy in carrying out this work. It was twilight time on a particular day when they were busy trying to complete a particular part of fencing.

A person from the ground level was throwing barbed wire to the person who was standing on the boundary wall. After getting hold of the wire, he fixed it in position. While doing so repeatedly, it so happened that once, the wire flew high. One free end of the wire touched one of the power lines crossing the boundary wall while the person on the wall touched the other end. The victim got severe burn injury in his fingers similar to a deep cut by a sharp tool and luckily escaped from electrocution. He was hospitalized and it took more than 2 months to heal the injury.

Remedial actions recommended:

- Risk assessment should be carried before awarding the contract.
- The presence of power line in the vicinity and the possible risks should be highlighted to the contractor.
- The contract worker who was working on the wall, nearer to the power line should be given and insisted to use shock proof rubber shoes and gloves.
- The contract worker should be informed of the probable hazards and instructed to be cautious during the course of the work.

CASE STUDY 2:
FATAL ACCIDENT INVOLVING A FORKLIFT

Accident description: A land drilling rig was being moved. A storage rack weighing 4 T had been moved and placed on its side for repair, close to the welders workshop for ease of repair and to avoid blocking traffic. A number of workers , including the deceased , were standing between the storage rack and the workshop. An operator took a forklift to get some gas cylinders , which were located close to the storage rack. Whilst manoeuvering, the forklift hit the rack which toppled over. It struck the deceased as it fell causing injury to his abdomen and trapped his foot underneath, injuring his leg. Despite proper medical treatment, he died from internal hemorrhage some time later.

Immediate causes:

- Placing the storage rack in a vertical, less stable position without securing it.
- Using a large forklift truck with limited visibility, not adapted for this type of lifting
- The forklift driver was not a trained personnel
- Manoeuvering the forklift in close proximity to the rack
- The deceased was a new recruit and lacked safety awareness

Fundamental Causes:

- Organization of work on site was not properly controlled. Positioning of the rack, gas cylinders and workers created a potentially dangerous situation.
- Lack of safety awareness, particularly non-perception of the risks of having the rack in a less stable, vertical position
- Qualification, training and experience of personnel were deficient

Recommendations:

Safety Culture

- Ensure the presence of a supervisor on site and he has enough authority and back up to work effectively.
- Enforce the permit to work system on site.
- Promote the use of unsafe act/ situation reporting.
- Promote a risk analysis culture at all levels

Training

- Ensure that forklifts are operated only by dedicated, trained and qualified drivers.
- Permit to work and Risk analysis training is essential including contractors.

Supervision

- Supervision of work is critical. Even routine work creates hazards that must be controlled by trained and aware supervisers.
- Daily site inspections should be performed and include checks for unstable equipments.

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TEN COMMANDMENTS OF GOOD SAFETY HABITS

Normally we make a "Trick" to make our job easier and faster. After we develop these tricks, they become work habits in our every day activities. Developing Safety Habits can keep us injury free through the year. Ten Safety Habits are listed here to develop among the working personnel.

1. **Set your own standard:**

   Don't be influenced by others around you who are negative. If you fail to wear safety glass, because others don't wear, remember the blindness you may suffer will be yours alone to live with.

2. **Operate the equipment only if qualified:**

   Your supervisor may not realise that you have never done the job before. You only have the responsibility to let your supervisor know, the necessary training has to be provided.

3. **Respect the Machinery:**

   If you put some thing in a machine, it will crush it, pinch it or cut it. Make sure all guards are in place. Never hurry beyond your ability to think and act. Remember to cut off the power supply before placing your hands in the operating zone.

4. **Use your own Initiative for Safety Protection:**

   You are in the best position to see the problems when they arise. You only should ask for the Personal Protective Equipment or additional guidance needed.

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Case Study....

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Facilities and Equipment

- Separate welding/ mechanical work zones from storage areas. Ensure such zones are clearly marked.
- Forklift trucks should be of a suitable size / capacity for the tasks involved. Strict procedures should be adopted to control the use of larger forklifts.

<u>CASE STUDY 3:</u>
FALL FROM ROOF

Accident Description: An employee of a wood panel manufacturer suffered severe back injuries when he fell 11.5 m through a hole in the factory roof. He was on the factory roof to collect wood debris and deposit it down a chute. To gain access to the chute he had to pass along a cordoned off area where two holes had been made in the roof in preparation for the installation of a new extractor unit. One of these holes had been left open, the other covered by an insulating board. During one trip through the cordoned off area, he stood on the hole covered by insulating board; it broke under his weight and he fell.

Remedial actions recommended:

- Before assigning any job, cultivate the habit of assessing the risks & hazards in executing the job
- Ensure permit to work system is adopted for carrying out any job in roofs.
- Assume that roofs are fragile unless you can confirm otherwise - there may be non-visible damage caused by weathering, deterioration, etc.
- Always avoid working on a roof if it is possible to carry out the work in another way, eg approaching the roof from below.
- Never go onto any part of a fragile roof without using platforms or crawling boards to support your weight.
- Fit appropriate warning signs to buildings which have fragile roofs, particularly at roof access points.
- Never walk along the line of the purling bolts - it is like walking a tightrope.
- Ensure that platforms are wide enough and long enough to give adequate support across roof members and ensure that enough platforms are provided on the roof.
- Protect against falling through the fragile roof adjacent to the platform by providing:

i. a properly installed safety net, scaffolding or similar close to the underside of the roof; or

ii. suitable guard rails and toe boards at the edges of the platform; or

iii. further suitable coverings over all fragile materials within 2m of the working platform. ■

IN THE NEWS

Indian Boiler Act Notification

The Indian Boiler Act 1923 was enacted in India with the objective to provide mainly for the safety of life and property of persons from the danger of explosion of steam boilers and for achieving uniformity in registration and inspections during operation and maintenance of boilers. Under the Indian Boiler Act 1923, Indian Boiler Regulations 1950 has been framed. The Regulation deals with the materials, procedures and inspection techniques to be adopted for the manufacture of boilers, boiler mountings and fittings.

The need to change the Indian Boiler Act was felt in the year 1974 and a High Power Committee was constituted with a view to get a comprehensive Review of laws on boilers and unfired pressure vessels.

The outcome was that the boiler law had outlived its utility. The committee felt that the states did not have adequate machinery or man power and technical expertise, and that the interpretation of the Indian Boiler Regulations and standards of inspection was also not uniform. The need for amending the act assumed importance as the development of industries could not be retarded by an obsolete law.

The amended Indian Boiler Act 2007 modified the outdated provisions of the old Boiler Act with provisions for the inspection of boilers during manufacture, erection, operation & maintenance in line with the present technological developments through the world. The amendments provided provisions for allowing inspection of boilers by private parties. Also it directed for appointment of Technical Advisers and Registration of Competent Authorities to carry out inspection of boilers during manufacture and use. The Act also has facilitated formation of a CENTRAL BOILER BOARD which is the apex body for the formulation of rules and guide lines for regulation of manufacture and use of boilers. It also brought uniformity of standards of inspection and helped in avoiding the Inter-state disputes. The Indian Boilers (Amendment) Act 2007 has come into force from October 7, 2010.

Fire sparks panic at Chennai port

Panic gripped Royapuram, Chennai for many hours after an abandoned tank containing bunker fuel residue at Chennai Port caught fire.

The thick black smoke from the tank engulfed the area and hundreds of people living in the neighbourhood were evacuated. Traffic was affected.

Fire and Rescue Services officials said sparks from welding work on a new tank nearby is suspected to have caused the fire. No one was injured in the incident.

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Residents evacuated:

The fire in the tank, near Gate 2 of the Chennai Port Trust, was noticed when thick black smoke started billowing out. Over 50 residents living in Trust Villa, the staff quarters of CISF, a few yards away, were the first to be evacuated. Fearing an explosion, several other residents of Royapuram were seen moving to safer places.

One of the residents said that he heard screams from the area near the tank and saw residents from the quarters running out. “Soon thick smoke started emerging from the tank,” he added.

Police personnel cordoned the area. Nine fire tenders, two foam tenders and 15 water lorries were rushed to the spot through the narrow roads.

The firemen positioned themselves atop Trust Villa and sprayed foam and water into the burning tank preventing the flames from spreading to the nearby tanks, some of which were said to contain crude oil and petroleum products.

After a three-hour-long battle, the fire was put out. By then the iron tank had completely melted.

Welding work was under way on one of the two newly installed tanks near the abandoned tank. Welders were fixing the iron stairs on one of the new tanks and the sparks seem to have fallen into the abandoned tank which contained fuel residue and it is believed to be the root cause for the fire.

New Specification for the use of Rubber Mats

New specification for the use of Rubber mats for electrical purposes: Bureau of Indian Standard-IS:5424:1969 has been superseded by New Standard IS:15652:2006 for insulating materials. This specification is intended for the purpose of insulating Mats for all electrical purposes.

The standard is applicable to insulating mats made of Elastomer (a generic term that includes rubbers, latex and elastomeric compounds that may be natural or synthetic or a mixture or a combination of both) for use as floor covering for the protection of workers on AC and DC installations with the system voltages upto 66 kV AC and 240 V DC.

It prescribes the requirements for the performance of the product, method of samplings, testing and acceptance.

While the human safety is the prime concern while developing this standard, it is clear that final safety of the worker is only obtained by considering also work methods, training of personnel and their safety issues.

The spread of the mat to be used for a certain work, the working methods, the care to be taken of the mat during use, periodic checks are some of the elements which will have influence on the final performance of the mat for the intended objective and shall be taken care of by the users.

It is recommended to get the optimum results from the mat procured as-per the new specification.

NEBOSH Course Update

The December 2010 batch International General Certificate Course of NEBOSH, UK was held at Sri Ramachandra University, Porur, Chennai. The contact classes were conducted from 25th November to 5th December and the examinations were conducted on 8th and 9th of December 2010. This time Nineteen candidates attended the contact classes as one candidate could not get leave to attend the course. As usual, class tests and model examinations were conducted in addition to tutorial classes and it was very much appreciated by the candidates. The Results are expected by 14th February 2011.

The next examination is scheduled on Wednesday, 9th March 2011 for which admissions have been in progress. SEA India encourages its members and other safety professionals to pursue this course to enhance their professional knowledge and career prospects. All those aspiring to join this course are requested to contact the Secretary by mail, **info@seaindia.org** for getting admission.

December 2010 Batch NEBOSH candidates with Tutors

Ten Commandments....

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5. **Ask questions:**

   If you are uncertain, don't hesitate to get it clarified. Do not accept answers that contain, "I think, I assume, I guess." Always be certain.

6. **Use care and caution while lifting:**

   Most muscle and spinal injuries are from over strain. Know your limitations. Do not attempt to exceed the limits. The few minutes it takes to get the help from others will prevent weeks of being off work and pain.

7. **Practice Good House-keeping:**

   Un organized work areas are the breeding grounds for the hazards and accidents. You may not be the only victim for it. Don't be the cause for it.

8. **Wear suitable and sensible work cloths:**

   Wear sturdy and appropriate foot wear. It should enclose the foot fully. Avoid loose clothing, dangling jewelry, and be sure that long hair is tied back and can not become entangled in the machines.

9. **Practice Good Personal Cleanliness:**

   Avoid touching the eyes, face and mouth with gloves or hands that are dirty. Wash your hands well and use barrier creams when necessary. Most industrial rashes are the result of poor hygiene practices.

10. **Be a positive part of the safety Team:**

    Accept and follow the Safety regulations willingly and with devotion. Encourage others also to follow them. Your attitude can play a major role in the prevention of accidents and injuries. ■

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