INDIAN SAFETY ENGINEER

QUARTERLY JOURNAL OF SAFETY ENGINEERS ASSOCIATION

SEA (INDIA)
(Regn No: 1391 / 2000)
[Registered under Societies Act, 1975]

G1, Vinoth Foundations, 254/5, Sundaramurthy Gramani Street, Virugambakkam, Chennai-600092.
Tel : 044-2377 4060 E-mail: info@seaindia.org Website: **www.seaindia.org**

VOL: 14 No. 2 **APRIL – JUNE 2015**

FROM THE DESK OF PRESIDENT

Dear Members,

Greetings to all of you!!

An event filled quarter is just over. Now, SEA Office is functioning from the new office premise at Virugambakkam from 1st May 2015, after performing a pooja.

Safety Professionals Meet for the year was conducted on 3rd July 2015 organised in collaboration with Directorate of Industrial Safety & Health, Government of Tamilnadu and Regional Labour Institute, Chennai, DGFASLI, Ministry of Labour & Employment, Government of India. More than 150 participants attended the programme that was held at Regional Labour Institute, Chennai. It was fitting that Thiru Kumar Jayanth, IAS, Secretary, Labour & Employment, Government of Tamil Nadu delivered the Valedictory Address.

On completing another successful year, SEA celebrated their 14th Anniversary celebrations on 4th July 2015. Special Technical Presentations on Robotic Safety and Challenges faced by Safety Professionals were made by specialists. Annual General Body Meeting was held in the afternoon.

Vacant Positions existing in the Executive Committee were filled in.

Mumbai Chapter of SEA and Students Chapter at Anna University, Chennai are active.

Next Nebosh IGC course is being planned during November / December 2015 and aspiring safety engineers may enroll their names with SEA office, as seats will be limited to 20 on first come first served basis.

Our website www.seaindia.org is being redesigned to include more additional features including advertisements from safety service providers. The site is expected to be launched shortly.

Best Wishes and Seasons Greetings!

S. Ulaganathan
President, SEA (India)

Inside....

Printed at Sunitha Printers, Chennai – 600 002

NEBOSH Course Update

Enquiries are being received for conducting the next Batch of Nebosh IGC course. Now it has been proposed to conduct one batch during November/December 2015. It may not be possible to conduct the course with lesser candidates as fees payable to NEBOSH, UK and British Council is huge. Hence we want to have the allowable twenty candidates for organizing the next batch.

Interested SEA India members can register their willingness by sending their Name, Qualification, Contact number and their mail ID to **paramesh48@msn.com** or **seaindiachennai@gmail.com**

The course fee and dates will be decided shortly.

The Grahapravesam Pooja of SEA India, new office building situated at G1, Vinoth Foundations, 254/5, Sundaramurthy Gramani St, Virugambakkam, Chennai - 600092 was performed on Friday, 1st May 2015.

40th Professional Development Programme

The 40th Professional Development Programme was held on Sunday, 5th April 2015 at Chennai.

Mr S Mani, Corporate SHE & CSR, Orchid Chemicals & Pharmaceuticals Ltd, Chennai delivered a talk on **"Safe Handling of Hazardous Wastes & its Management".**

Large number of SEA India members participated and enriched their knowledge.

Salient topics discussed in this programme are published in this journal for the sake of all SEA India members who could not attend this programme.

Kind Attention of Members....

Even after repeated reminders to UPDATE the Postal Address and PERSONAL E-MAIL ID's many members have not taken it seriously. **Since most of the companies do not entertain bulk E-mails you would not be able to view the SAFETY ALERTS & other communications send by us.** Hence, SEA (India) members are once again requested to send their **current postal address** and **active Email ID (personal)** to us at the earliest to:

seaindiachennai@gmail.com / seaindiachennai@rediffmail.com

SEVEN KEY LESSONS FROM RECENT HOT WORK ACCIDENTS

1. Use Alternatives – Whenever possible, avoid hot work and consider alternative methods.

2. Analyze the Hazards – Prior to the initiation of hot work, perform a hazard assessment that identifies the scope of the work, potential hazards, and methods of hazard control.

3. Monitor the Atmosphere – Conduct effective gas monitoring in the work area using a properly calibrated combustible gas detector prior to and during hot work activities, even in areas where a flammable atmosphere is not anticipated.

4. Test the Area – In work areas where flammable liquids and gases are stored or handled, drain and/or purge all equipment and piping before hot work is conducted. When welding on or in the vicinity of storage tanks and other containers, properly test and if necessary continuously monitor all surrounding tanks or adjacent spaces (not just the tank or container being worked on) for the presence of flammables and eliminate potential sources of flammables.

5. Use Written Permits – Ensure that qualified personnel familiar with the specific site hazards review and authorize all hot work and issue permits specifically identifying the work to be conducted and the required precautions.

6. Train Thoroughly – Train personnel on hot work policies/procedures, proper use and calibration of combustible gas detectors, safety equipment, and job specific hazards and controls in a language understood by the workforce.

7. Supervise Contractors – Provide safety supervision for outside contractors conducting hot work. Inform contractors about site-specific hazards including the presence of flammable materials. ■

"Avoid hot work of any kind in areas handling, processing or storing flammable liquids or gases".

"Use portable combustible gas analyzer before and during the work. If any detectible readings are obtained, then work cannot begin or continue until the source is found and suitably mitigated such that the concentration is maintained below 10% of the LFL (lower flammble limit)".

Picture: Example of a combustible gas detector used to test for the presence of flammable gas or vapor

LED-DRIVEN INFRARED SENSORS

Shining new light on LEL gas measurement for oil and gas and confined space entry applications.

Oil and gas production and work in confined space exposes field personnel to a variety of toxic and explosive gases in everyday drilling, processing, transport, and municipal operations. Explosive gas build-ups can endanger not only the workers nearby, but also a widespread area beyond the working area; making fast, accurate measurement of combustible gases below LEL levels is critical to maintaining safety.

Today, there are two main sensor technologies used for detecting explosive gases: catalytic bead and infrared.

Catalytic Bead Sensors

Catalytic bead, or "pellistor," sensors were developed in the 1960s as a more accurate replacement to canaries as early warning systems for toxic and explosive gases in mines. The sensor design features a platinum coil embedded in a catalyst-coated alumina bead. A gas sample oxidizes, or combusts, upon contact with the catalyst, causing the temperature of the bead to increase, which in turn causes the resistance of the platinum coil to change. The measured change in resistance indicates the amount of combustible gas present.

The sensor responds differently to

(Contd. on next page)

LED-Driven....

(Contd. from previous page)

different types of combustible gases due to four main causes:

1. Heat of combustion. Different gases burn, or combust, at different temperatures, causing different amounts of heat to be transferred to the bead, and thus different changes in resistance through the platinum coil.

2. Lower Explosive Limit (LEL) volume.

Each combustible gas has a particular concentration in air at which it becomes explosive. When a sensor displays a percentage of LEL readout, it is based on the LEL concentration for a specific reference gas. It is no surprise that the gases with a higher v/v percentage required for their LEL also have higher signal outputs on catalytic bead sensors.

3. Diffusion due to Brownian motion. Gas molecules diffuse through air and filters, with the speed largely dependent on their molecular size. Large gas molecules, such as the long hydrocarbon chains, diffuse more slowly than smaller molecules, such as methane gas.

4. Catalyst-gas reactivity. Combustible gases react differently to different catalyst coatings. One coating may react strongly to a particular gas but only weakly to another gas.

Though they've been in use for more than 60 years, catalytic bead sensors have changed very little over time. Most improvements have been focused on the catalyst materials used to coat the alumina beads, along with the reduction in bead size, to reduce required power, but the majority of the design remains unchanged.

During normal sensor operation, gases reacting with the catalyst can consume the catalyst coating, gradually degrading sensitivity and causing signal drift and reducing the lifespan of the sensor. Because of this, catalytic bead sensors have a typical lifespan of three to five years (most are warranted for two years) and must be calibrated and tested as frequently as every day, and no less than every 90 days.

Catalytic bead sensors are also susceptible to poisoning by a variety of materials commonly found in oil and gas applications, including silicone vapors, sulfur compounds such as hydrogen sulfide (H2S), and halogenated hydrocarbons, such as those used in fire suppression. These chemicals reduce and eventually completely degrade the sensitivity of the catalytic bead sensor until it fails to react to gas at all, a potentially hazardous condition.

Because catalytic bead sensors combust the target gas within the sensor cell, they are not typically intrinsically safe, and a flame arrestor must be used to prevent ignition of environmental gases. This flame arrestor significantly reduces sensor response to large hydrocarbons, such as those found in diesel gasoline and jet fuel. The sensor will read low even in high concentrations of those gases. Oxygen also must be present in the environment for the target gas to combust; pellistor sensors will not work in the inert, oxygen-depleted atmospheres used in many oil and gas operations.

Catalytic bead sensors require around 225mW of power to operate. For the average portable four-gas detector, the catalytic bead type LEL sensor typically accounts for more than half of the total power draw of the unit, which results in typical run times of 10-20 hours before a detector must be charged.

Non-Dispersive Infrared Sensors

In more recent years, non-dispersive infrared (NDIR) sensors have emerged as an alternative for the aging catalytic bead technology. Infrared sensors consist of a gas cell through which infrared radiation passes. Gas molecules in the cell absorb certain frequencies of radiation in the bonds between dissimilar atoms (carbon and hydrogen, for example). Dual infrared radiation detectors within the gas cell measure the amount of radiation transmitted through the gas (active detector). The reference detector measures a specific IR wavelength that is not absorbed by either the target hydrocarbon molecules or possible interfering molecules, such as water vapor, to compensate for any interfering factors such as dust and humidity. The difference in radiation measured by the two detectors indicates the level of gas present. ■

EARTHQUAKE

Unlike hurricanes and some other natural hazards, earthquakes strike suddenly and without warning. It is important to be familiar with the following procedures. Knowing how to respond and what to do could save your life.

Most high rise buildings are designed as per the seismic zone categorization of the area and designed to sway as they should during earthquakes, unsecured objects will slide around inside, particularly on the upper floors. That is why it is important to secure the furnishings of a high rise building. Anchoring pieces of furniture will prevent them from sliding back and forth, even acting as battering rams to break through windows or walls. Carpets may help reduce this action. Large windows above the fourth and fifth floor would have guard rails installed on the inside, and/ or shatter resistant plastic film on the glass

Movement of the ground is seldom the actual cause of death or injury. Most casualties result from partial building collapse, falling objects and debris, like toppling chimneys, ceiling plaster and light fixtures.

PROCEDURES

All Personnel:

Before the shaking starts, know the safe spots in your area:

- Against inside walls
- Under study tables, desks or supported doorways

Know the danger spots:

- Windows
- Mirrors
- Hanging objects
- Tall unsecured furniture and fixtures

Know where your emergency telephone numbers are kept.

During the shaking:

Drop, Cover, and Hold: The most dangerous thing that can happen indoors is falling objects, so make sure you get under your desk when the ground shakes and hold onto it.

If you are INDOORS:

- Seek refuge in the corner of the room against the wall or under a desk or table.
- Stay away from glass windows, shelves, and heavy equipment.
- If you are under a table or desk, hold on to the furniture so it can't move away from you.

If you are OUTDOORS:

- Get into an open area away from trees, buildings, walls and power lines
- Do not use elevators
- If in a CROWDED PUBLIC PLACE do not rush for the doors. Move away from shelves that may contain objects that could fall.

If you are in an AUTOMOBILE:

- Stop in the safest place available, preferably away from power lines, street lights, and trees. Remain in the vehicle for the shelter it offers.

Caution: Always avoid power or utility lines. They may be energized.

After the shaking stops:

- Check for injuries. Apply first aid as you may be trained to provide. Do NOT move injured individuals unless they are in immediate danger
- If there is severe injury you should call for help or send someone for help, otherwise do not tie up the telephone lines.
- Be prepared for AFTER-SHOCKS. Evacuate the building when advised to do so

Follow-Up Procedure:

- Secure the area and confirm that concerned authorities have been notified
- Ensure all employees are clear of the area
- Provide reasonable assistance to Fire, Ambulance and Facilities crews as requested
- Report any information to proper authorities relating to the earthquake
- Do not return to an evacuated building unless told to do so.

■

NICKEL – HEALTH HAZARDS

Introduction

Working with nickel and its compounds may affect your health. The possible health effects, the preventative measures your employer needs to apply, and the precautions you should take are dealt with in this article.

Not all forms of nickel present the same dangers – this article will help you identify the specific hazards from the nickel in your workplace.

What is nickel?

Nickel is a silvery-grey metal. It is used mainly:

- in alloys with other metals;
- as its compounds, which are often a bright green colour.

Where is it found?

Nickel can be found in:

- alloys, particularly nickel/copper and nickel/chromium, in the manufacture of stainless steel, coins, magnets, chemical and food process equipment, and in the aerospace industry;
- polishing or other processes on stainless steel and nickel alloy articles;
- the welding of nickel and alloys and when using welding rods containing nickel;
- the electroplating industry;
- pigments for paint, pottery, glass and plastics;
- catalysts in the chemical industry.

How can it get into your body?

Nickel can enter the body:

- by breathing in dust, fumes or mist containing nickel;
- by skin contact with dust or solutions containing nickel.

What are the health hazards?

The toxicity of nickel metal and inorganic nickel compounds vary, depending on their solubility (how easily they dissolve). However, general short-term effects can include:

- irritation of the skin on contact with solutions of soluble nickel salts;
- eye irritation from exposure to nickel dust, fumes, or splashes from nickelcontaining solutions.

Longer-term effects can include:

- allergic reactions in the skin and respiratory tract and asthma;
- inflammation of the lungs;
- cancer of the lung and nose, particularly the sinuses.

What does your employer have to do?

The Control of Substances Hazardous to Health (COSHH) Regulations 2002 require your employer to:

- assess the risks to your health and the precautions needed for your protection;
- prevent you being exposed to nickel and its compounds, or where this cannot reasonably be done, adequately control your exposure;
- maintain all fume and dust controls in efficient working order;
- provide fit testing of any tight-fitting respirators;
- find out how much nickel you are exposed to, normally through a monitoring programme, and tell you the results;
- arrange any health checks that are necessary;
- inform, instruct and train all employees who may be exposed to nickel;
- reduce your exposure to airborne nickel and its compounds so far as reasonably practicable, and in any case below the workplace exposure limits (WELs) assigned for nickel and its compounds as follows:
- nickel and its water-insoluble compounds – 0.5 milligrams per cubic metre of air averaged over an 8-hour period;
- water-soluble nickel compounds – 0.1 milligrams per cubic metre of air averaged over an 8-hour period.

What should you do?

- Use the extraction equipment or other control measures correctly.
- Use the protective clothing and equipment provided.
- Always use the washing facilities provided, which should be adequate and suitable for your needs.
- If you have to wear a respirator make sure:
- it fits properly;
- if it is a tight-fitting mask, that you have been fit tested and are clean shaven;
- it is clean and in good working order;
- the filter is changed regularly;
- it is stored in a clean/dry place, preferably a locker.
- Report defects in enclosures, extraction equipment or other control measures to your employers.

(Contd. on next page)

HAZARDOUS WASTE MANAGEMENT

By **Mr S Mani,** Corporate SHE & CSR, Orchid Chemicals & Pharmaceuticals Ltd., Chennai

The purpose of the presentation is to educate and familiarize the industries generating hazardous waste on following

- Legislations related to Hazardous waste
- Hazardous waste
- Handling and disposal methods - Hazardous waste
- IWMA and its role in Management of Hazardous Waste
- Monitoring Mechanisms
- Forms applicable to Hazardous Waste Management
- Role as Chemical Professionals

Hazardous Waste

Hazardous waste is a waste with properties that make it dangerous or potentially harmful to human health or the environment. Hazardous wastes can be liquids, solids, contained gases, or sludges. They can be the by-products of manufacturing processes or simply discarded commercial products. The following characteristics of Hazardous waste are considered to be criteria for Identification of Hazardous waste:

- IGNITABILITY
- CORROSIVITY
- REACTIVITY
- TOXICITY

Hazardous waste is regulated by elaborate legislation of which the following are important

- The HW (Management, Handling & Trans-boundary Movement) Rules, 2008 Original Rules came in 1989, which were amended in 2000, 2003, 2008, 2010.
- Plastics Rules (Manufacture, Usage & Waste Management) Rules
- The Bio-Medical Waste (Management & Handling) Rules, 1998, 2003.
- The Municipal Solid Wastes (Management and Handling) Rules, 2000.
- E-Waste (Management and Handling), Rules, 2011

Effects of Waste Disposal

The disposal of waste has consequences on the environment which must be properly monitored and controlled. Some of the effects are Resource depletion, Strain on availability of land, Ground water contamination by the leachate, Surface water contamination by the run-off, Bad odour, pests, rodents and wind-blown litter, Generation of inflammable gas (e.g. methane) and fires, Bird menace, Epidemics through stray animals, Acidity to surrounding soil and Release of green house gases.

Disposal Methods

Based on the analysis of Hazardous Waste Characteristics, the method of disposal is decided. The general methods available for disposal are Landfill and incineration. The below chart depicts the waste characteristics and method of disposal.

Secure Landfill

Landfill means a disposal facility or a part of a facility where hazardous

(Contd. on next page)

Nickel....

(Contd. from previous page)

- Don't eat or drink in work areas where nickel may be present.

What about health checks?

The health of people exposed to nickel and its compounds should be monitored by an occupational health professional:

- They will normally carry out an examination after an offer of employment and will see you at regular intervals during your employment. You will be asked to provide a urine sample so its nickel content can be measured.
- You should examine your skin regularly, looking for colour changes, rashes and skin damage. The occupational health professional will give you advice.
- If additional examination or tests are needed, the occupational health professional will explain.

What information can you get?

Your employer should tell you about:

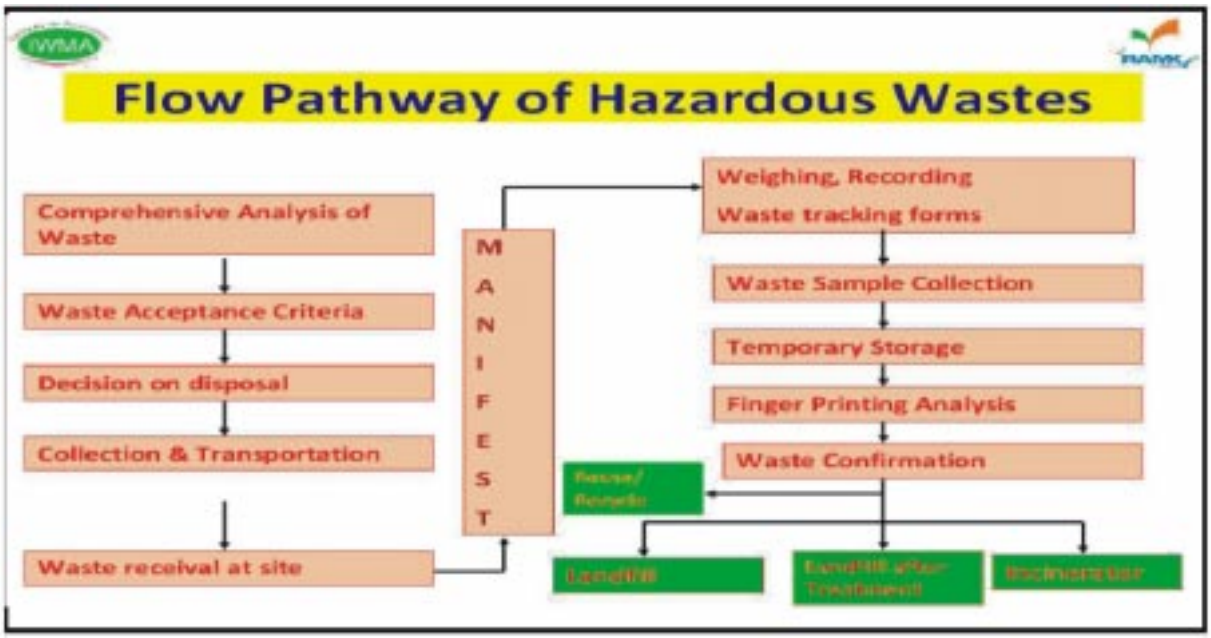
- the risks to health from the use of nickel;
- the safe way of working, the reasons for it, and how to use equipment properly, eg extraction systems;
- the reasons for personal protective equipment and clothing, the jobs where they are necessary, and how they should be used, stored and maintained;
- the results of any tests for nickel levels in the air of your workplace;
- the role of any health surveillance and arrangements for you to know the results;

If you have any worries or problems about working with nickel or its compounds, ask your supervisor or safety representative to discuss them with your employer, or discuss them with the occupational health professional. ■

Hazardous....

(Contd. from previous page)

Flow Chart on handling of Hazardous Waste



waste is placed in or on land.

Landfill that uses liner to provide isolation of waste from adjacent cells or waste. Liner means continuous layer of natural or man-made material, beneath or, on the sides of a surface impoundant, landfill or landfill cells, which restrict the downward or lateral escape of hazardous waste, hazardous waste constituents, or leachate.

Incineration

Incineration is a high temperature, thermal oxidation process in which hazardous wastes are converted in presence of oxygen in the air into gases and incombustible solid residue. Gases are vented into atmosphere through Gas cleaning system and solid residue goes to landfill. Incineration is applied to certain wastes that cannot be recycled, reused or safely deposited in a landfill.

Eg. – Solvent Waste, Pharmaceuticals Waste, refinery waste etc.

Co Processing

Co-processing means the substitution of primary fuel and raw material by waste. It is a recovery of energy and material from waste. This refers to the use of waste materials in industrial processes, such as cement, lime, or steel production and power stations or any other large Combustion plants.

Pre Processing

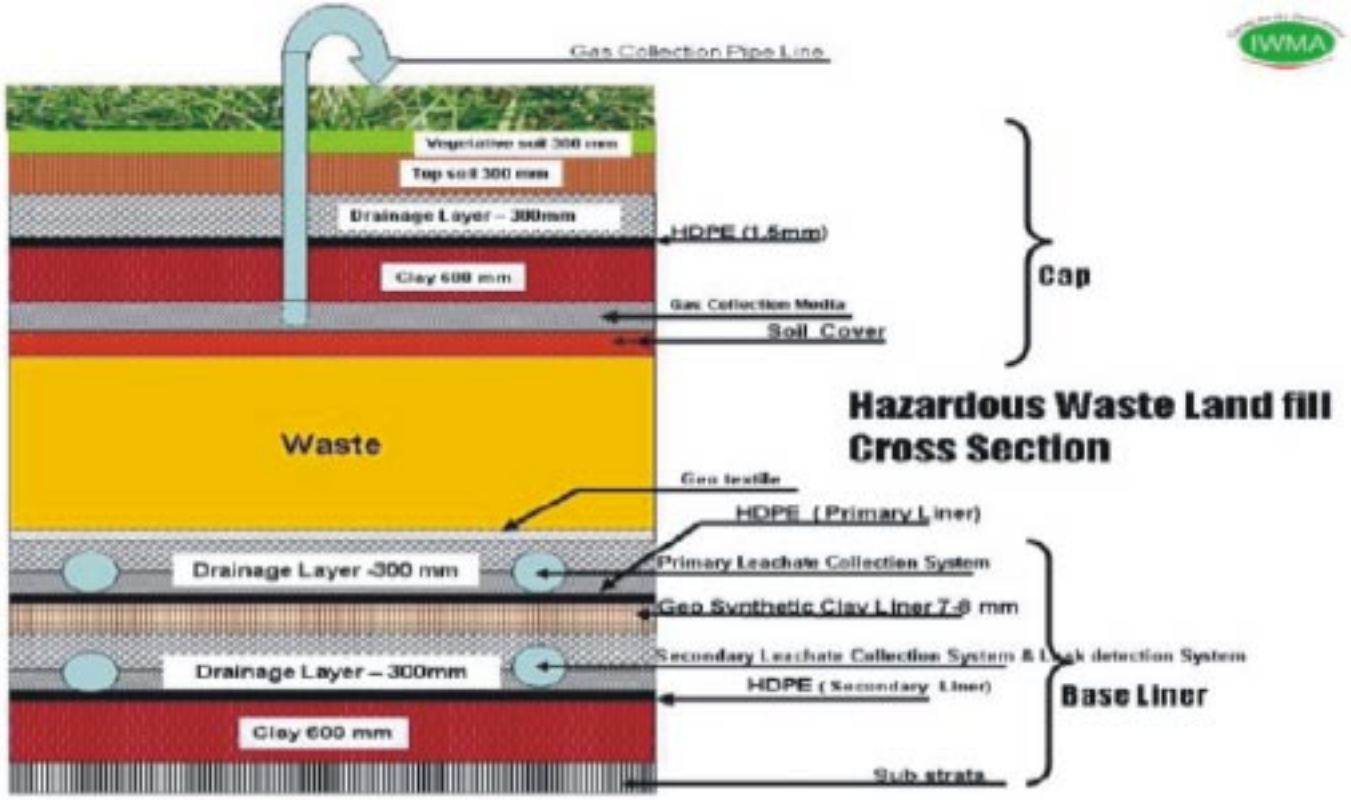
Pre-processing is the concept of preparing a wide variety of waste materials into a homogeneous product of defined size and chemical composition. It involves size reduction and blending operations. It does not involve any form of

(Contd. on next page)

Hazardous....

(Contd. from previous page)

Cross Section of A Land Fill



A View of Incinerator of Tamilnadu Waste Management Limited

chemical conditioning. It is essentially a mechanical operation utilizing shredding, pneumatic separation, blending and sieving technologies. Individual waste analysis and compatibility testing is essential for safe and secure operation. The variations in physical state, chemical properties and size of the different waste materials can be uniformly controlled. The final pre-processed materials can be co-processed in any resource intensive industry as alternative fuels and raw materials. Therefore it is called AFR.

IWMA

The Association named Industrial Waste Management Association (IWMA) was inaugurated in TNPCB auditorium to give credence to active support by the Government of Tamil Nadu. The committee was registered as a non-profit Association with representation from industries of Tamilnadu in 2002.

This Committee comprising industrial representatives was formed under the auspices of Tamil Nadu Pollution Control Board (TNPCB) to coordinate the establishment and operation of CHWTSDF for hazardous waste generated by industries in Tamil Nadu. This was registered as a non-profit Association with representation from industries of Tamilnadu in 2002.

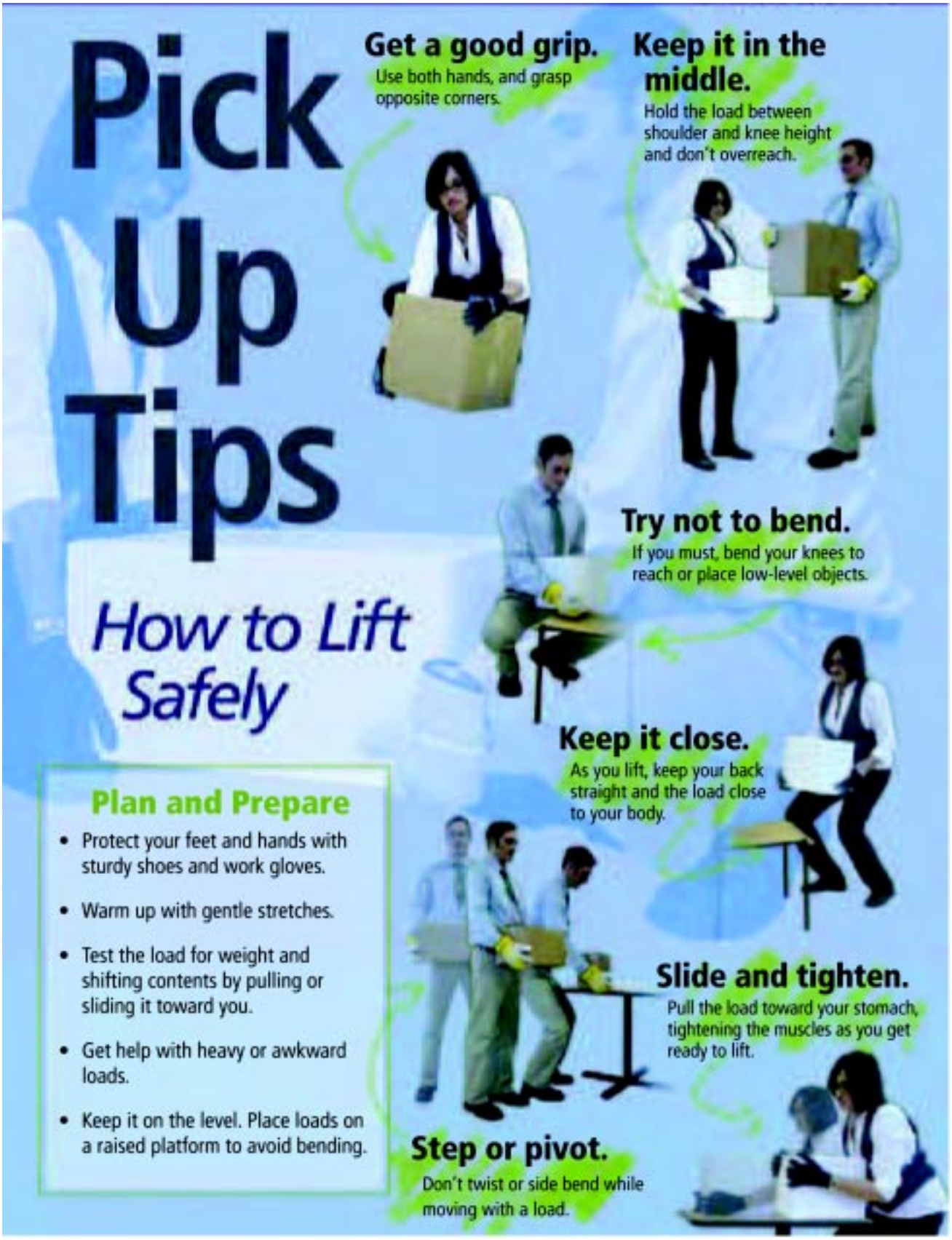
IWMA has membership of around 1900 companies of small, medium and lager scale industries of various discipline such as textile, Printing, Automobile, leather, Pharmaceutical and Engineering etc.,

Monitoring Ground Water, Surface Water, Air and Soil quality are regularly monitored through self monitoring programme, TNPCB Inspections and Third Party

Role as Chemical Professionals

Use - REDUCE, REUSE, RECYCLE, RECOVER - Principle. Sensitize Line Management and Leadership abo■ Law. Use various Networks constantly to share/bring new ideas.

Safety poster - Manual Lifting



CASE STUDY

CASE STUDY 1:

SERIOUS ACCIDENT DURING MATERIAL HANDLING DUE TO UNSAFE SYSTEM OF WORK

In one factory a worker met with a serious accident, while loading the M. S. Plates on the platform of the truck, sustaining serious head injury which proved fatal. This accident occurred due to adoption of unsafe system of work.

ABOUT ACCIDENT:

On the day of accident, the deceased worker, had attended the duty at 8.30 am as usual along with three coworkers And the work of loading the MS plates (size – 5m.x 1.25m. x 6mm) in the truck was being carried on in the stored yard of the factory.

In store yard of the factory, there are various types of material such as MS bars, angles, channels, pipes including MS Plates and on the said day the work of loading of MS plates was to be completed, which was started with the help of JCB loader for lifting the plates, employing four workers.

The system and arrangement of loading the M S plates in the truck was as follows.

The plate which was to be loaded in the truck was being made holes lengthwise at a distance of one meter from both the ends of the plate by gas cutter. Then the wire rope (5/ 8') with Dshackle was bolted in both the holes and the plate was lifted vertically by JCB (power-76 hp.) 6 inch above the height of platform of the truck (4 ft.) and was being dropped on the platform which was falling horizontally with huge sound on the platform with most of the portion outside the platform of the truck in imbalance position Then the four workers were used to push the plate inside, on the platform so as to load it completely on the platform.

It is marked that, the JCB which is used specifically for digging purpose was used for lifting and loading the heavy plates resulting into the said fatal accident.

On the day of accident, the deceased worker, along with his coworkers started the work of loading at 9 am. and completed the loading of one MS plate by 9.30 am. As there were total 12 Plates the supervisor thought that loading may consume more time if plates are loaded one by one and therefore second time two plates were taken at a time, which were made holes by gas cutter and wire rope with Dshackle was bolted to both the plates and was lifted vertically by the hand (bucket) of JCB and dropped on the platform of the truck.

The plates fell horizontally on the platform in such a way that most of the portion (75 %) was outside the platform. Immediately after falling the plates, the deceased worker who was standing there itself, started loading the plates, along with three coworkers by pushing the said plates inside, on the platform and while doing so, the plates which were in imbalance position due to maximum portion outside, fell on the body of the workers. However the other coworkers escaped miraculously and the plates fell on the back of the deceased sustaining serious head and neck injury. The other workers nearby rush to the spot. However the deceased worker was profusely bleeding. He was immediately taken to Hospital. However Doctor examined and declared him dead.

WHAT WENT WRONG:

The lifting of heavy M S plates by JCB loader is itself very dangerous act since it is not meant for lifting plates but for the use of digging the

(Contd. on next page)

Case Study....

(Contd. from previous page)

soil. Further for loading the plates after falling in imbalance position on the platform of the truck, the workers should not have allowed to push it inside , on the platform of the truck unless stable position of the plates was ensured which was not done and resulted into the said fatal accident.

Secondly, the arrangement used in connection with handling that is lifting the plates was done by JCB loader which is at all not meant for the said purpose.

The Management should have provided and carried out the said work of lifting and loading by making the arrangement of suitable crane to ensure the health and safety of the workers at work and further by adopting the proper system of work that are safe and without the risk to health, which could have prevented the said accident.

REMEDIAL MEASURES :

1) Suitable crane with adequate lifting capacity shall be provided for lifting / handling the heavy MS plates.
2) The plates shall not be lifted vertically and dropped down from the distance which is dangerous to cause accident.
3) The proper system of lifting and loading shall be adopted to ensure safety and absence of risk to the health of the workers.
4) The workers shall be well acquainted and properly trained to carry out the loading of heavy plates.
5) Protective wears like safety shoes, helmet, hand gloves shall be provided to the workers.

CASE STUDY 2:

SERIOUS ACCIDENT WHILE HANDLING HIGHLY FLAMMABLE SOLVENT

A fatal accident had occurred while carrying out the manufacturing process for rubber hose, in which use of a highly flammable solvent was involved.

HISTORY:

The factory was involved in the manufacturing of rubber hoses required for automobiles. The manufacturing process was as follows. Raw rubber and chemicals were mixed in a rubber mill to obtain sheets of rubber compound. The rubber compound sheets were sent to the extrusion machine, where inner tube of the rubber hose was prepared. Then braiding of polyester yarn was formed on the inner tube on the braiding machine. After carrying out surface treatment by using toluene, the reinforced inner tube was subjected to co-extrusion process for outer formation. The rubber hose so obtained was then cut and mounted on the mandrel.

Then vulcanization is carried out and hose was extracted from the mandrel. The hose was then packed and dispatched.

The extrusion machine used in the said process included extrusion barrel provided with a screw inside. The screw was driven by the electric motor through a gearbox. The barrel of the machine was provided with a straight head and

the cross head at its outlet called die head block. The braided inner tube passes initially through a toluene trough and through the straight head, while the rubber strip was fed to the screw conveyor, which passes it to the cross head to form outer over the braided inner tube. The die head block was required to be heated initially to maintain a rubber flow. In the factory, heating of head block was carried out with the help of a portable kerosene burner. Once, it was heated initially, further heating took place due to friction of screw

(Contd. on next page)

Case Study....

(Contd. from previous page)

and a rubber. A trough (tank) of capacity 15 L containing toluene was mounted on the stand. The stand was portable and was kept adjacent to the die head block of the extrusion machine, while carrying out the outer formation. The water cooling arrangement was provided for the cooling of the extruded rubber hose. Then the hose was applied with a powder to prevent sticking.

ABOUT ACCIDENT:

The deceased worker was working as an operator. On the day of incidence, the deceased worker along with four workers working as helpers were entrusted with the work of co extrusion process on Extrusion machine for the formation of different sizes of rubber hoses. Accordingly, they started carrying out the said work. The work involved was as follows.

The deceased worker fitted the die head block for the job and carried out setting. One worker ignited the kerosene burner and started heating of the die head block by a kerosene burner. Then the deceased worker asked another worker to pour toluene into the trough. While the worker was carrying out heating of the die head block with the help of kerosene burner, the other worker was pouring toluene into the trough with the help of a 20 L capacity drum manually. At that time, the flame of the kerosene burner reached the toluene in the trough and toluene in the trough and a drum caught fire. Due to this the drum flew up and the burning toluene splashed over all of them and they received burn injuries. The fire was extinguished immediately within 5 minutes with the help of extinguishers. They were shifted to the Hospital, for the treatment. The deceased worker received about 50% burn injuries and he succumbed to burn injuries while under the treatment in the Hospital. The other workers received about 30%, 40%, 4%, 15% burn injuries and were discharged from the hospital after the treatment.

OBSERVATIONS:

A rectangular MS trough (tank) of capacity 15 litres and having size about 1200 mm length x 150 mm width x 175 mm depth was kept on the MS stand of height 800 mm. The trough is not found fastened with the stand. The sludge of rubber solution is found accumulated at the bottom of the trough. The top of the trough was found open and the cover provided is not found fixable. The kerosene fired burner was found used for heating the die head block.

WHAT WENT WRONG?

The trough containing toluene was having its top open. The vapours of highly flammable solvent-toluene formed flammable mixture with the air. The flammable mixture received a source of ignition from the open flame of the kerosene burner. As a result, flammable mixture formed by toluene with air caught fire The fire reached to the drum, which flew up from the hands of the worker. The burning toluene splashed over all of them and their clothes caught fire and they received burn injuries.

It is revealed that-

i) The precautions were not taken to prevent initiation of ignition from sources such as open flames from kerosene burner. The highly flammable solvent toluene ought not to have been handled unless the kerosene burner is stopped or taken away from the work place to prevent the initiation of ignition from the open flame from the kerosene burner.

ii) The precautionary notice showing information and instructions in respect of toluene, was not displayed near the machine to ensure safety of workers at work.

iii) Also, while carrying out the said work, supervision was not provided on the work to ensure safety of workers at work.

REMEDIAL MEASURES SUGGESTED:

i) The open flame kerosene burner shall not be used, where highly flammable solvents like toluene are being used.

ii) Arrangement can be made to fill the tolune trough mechanically.

iii) The tolune trough area can be well ventillated so as to dilute the tolune vapour.

iv) Precautionary notice showing information, instruction in respect of toluene shall be displayed near the machine. Such work shall be carried out under supervision of a qualified supervisor. ■

VITAL FIRST AID TIPS

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 immediately and continue soaking till pain subsides. If the skin is broken, cover with sterile 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.

SPINAL INJURY:

The spinal cord connects the brain to the rest of the body. Together they make up the central nervous system.

The spine is made up of:

- the spinal cord itself
- the bones that protect the spinal cord (called vertebrae)
- the discs of tissue between the vertebrae
- the surrounding muscles
- and the nerves which branch off it, to carry messages between the brain and the rest of the body in the form of high-speed electric pulses.

The spinal cord connects to individual muscles and tells them to move (called motor function). It also connects to organs like the skin, which communicates feelings like touch, pain and heat (called sensory functions).

The greatest risk if someone has a spinal injury is that their spinal cord will be either temporarily or permanently damaged. If this happens, they'll become paralysed from the point of injury down.

The most common cause of a spinal injury is extreme force, violent twisting or bending forwards or backwards. You should be aware of the possibility of a spinal injury if someone has:

- fallen from a height, e.g. a ladder
- fallen awkwardly, e.g. while doing gymnastics
- dived into a shallow pool and hit the bottom
- fallen from a moving vehicle, e.g. a motorbike, or a horse
- been in a collapsed rugby scrum
- been in a motor vehicle which suddenly crashes
- been hit by a heavy object falling across their back
- had an injury to the head or face.

What to look for - Spinal injury

If you think someone may have injured their spine, these are the seven key things to look for:

If the vertebrae (bones protecting the spinal cord) are damaged:

1) pain in the neck or back
2) unusual shape or twist in the normal curve of the spine
3) soreness and/or bruising in the skin over the spine

If the spinal cord is damaged:

4) loss of control over limbs – may not be able to move arms or legs
5) loss of sensation, or abnormal sensations, e.g. burning or tingling
6) loss of bladder and/or bowel control
7) breathing difficulties

What you need to do - Spinal injury

If they're conscious:

- Reassure them and tell them not to move
- Call an ambulance or ask someone else to call one for you
- You need to stop their head or neck from moving to prevent further damage
- To do this, kneel or lie behind their head. Rest your elbows on the ground or on your knees to keep your arms steady. Grip each side of their head, without covering the ears, to support their head in this position so that the head, neck and spine are in a straight line
- You need to support the head until emergency services can take over, no matter how long it takes for them to come. If there is someone who can help you, ask them to put rolled-up blankets, towels or clothes on either side of the head to help support it.

If they're unconscious:

- Open their airway using the jaw-thrust technique. To do this, put your fingertips at the angles of the jaw and gently lift to open the airway, avoiding tilting the neck
- Then check if they're breathing
- If they're breathing, continue to support their head and call for an ambulance. If you can't maintain an open airway then carefully follow the instructions of how to put someone with a spinal injury in the recovery position.

If they're not breathing, you'll need to start CPR (cardiopulmonary resuscitation)

While waiting for help to arrive, keep checking their breathing, pulse and level of response.

■

IN THE NEWS

World Environmental Day – June 5, 2015

World Environment Day (WED) this year takes centre stage on 5 June 2015 at the Expo Milano, Italy, as one of the United Nation's international celebrations. There is evidence that the rate of consumption of the planet's resources is now unsustainable and possibly at a tipping point where Earth's natural regenerative capacity could be lost forever. Today, the human race consumes resources the equivalent of 1.5 planets. This means that it now takes the Earth one year and six months to regenerate what we consume in a year. By 2030 we will need two planets to sustain our ways of living if the current consumption and production patterns remain the same, and with a rising population.

This year's theme for WED – **Seven Billion Dreams. One Planet. Consume with Care** – therefore expresses the challenge of creating opportunities for inclusive and sustainable economic development, while attempting to stabilise the rate of resource use and reduce environmental impacts. What is the one thing you pledge to do in order to restore our planet's natural regenerative ability? Bike to work, change your light, fix leaky pipes or recycle old devices? If seven billion people were to each make one positive change towards a sustainable lifestyle, what would our world be like?

This year, World Environment Day challenges everyone to re-imagine their dreams for a good life de-linked from excessive consumption. Celebrate World Environment Day on 5 June by sharing your vision for a life of well being on a sustainable planet.

World Day for Safety and Health at Work 2015

ILO Director-General: Building a culture of prevention on occupational safety and health: The news is punctuated periodically by intense coverage of dramatic, heartbreaking stories that capture global attention: health workers infected while caring for patients with deadly diseases, trapped miners who may or may not resurface, factory building collapses, plane crashes, explosions of oil rigs and nuclear accidents.

While the media eventually move on to other topics, working in hazardous conditions is actually a daily, routine and unseen affair for many workers. The numbers are striking. Over 313 million workers suffer non-fatal occupational injuries each year, equating to 860,000 people injured on the job daily. Every single day, 6,400 people die from an occupational accident or disease, amounting to 2.3 million deaths each year. Work-related accidents or diseases can definitely be placed in the high-burden category of all global health problems.

Economic recession or pressure to maximize profits cannot justify cutting corners in workplace safety.

Actually, failure to do so comes at a high price. Four per cent of global gross domestic product, equivalent to an astounding US$2.8 trillion, is drained off annually by costs related to lost working time, interruptions in production, treatment of occupational injuries and diseases, rehabilitation and compensation.

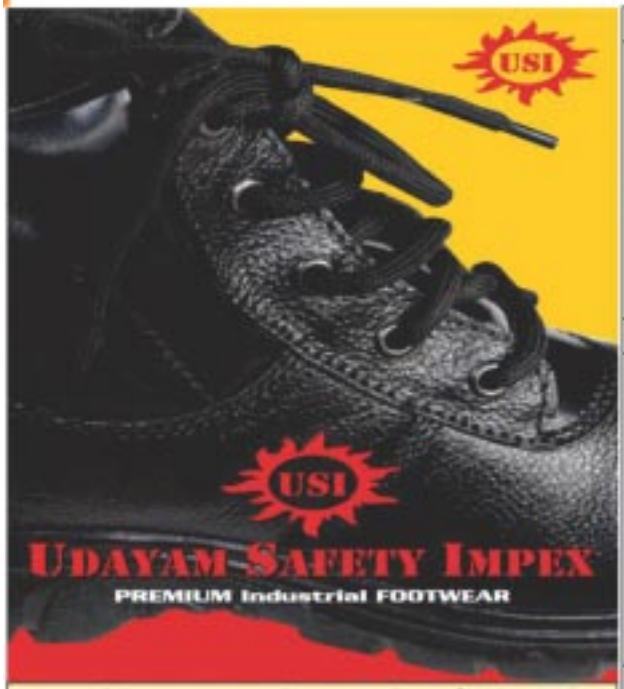
A long-standing ILO priority, occupational safety and health was recognized as a fundamental human right in the 2008 Seoul Declaration on Safety and Health at Work . It is time to turn this human right into reality for workers everywhere.

Good governance on occupational safety and health shows that prevention pays. Today, on the occasion of World Day for Safety and Health at Work, the ILO calls for urgent action to build a culture of prevention on occupational safety and health.

UDAYAM SAFETY IMPEX

Safety Starts with 'Us' !

Registered Office:
No.11-A, Chippoy Nagar,
Kumananchavadi,
Poonamalle, Chennai-600 056
Email: udayamsafetyimpex@gmail.com
Phone: 91713-06432; 98658-56928



Some of the important features of our leather safety shoes are:

- Rust Resistant steel toe cap
- High quality tough buff leather with a thickness of 1.8-2mm (best in industry)
- Padded soft PU tongue for extra comfort
- 150-200GSM breathable sweat free polyester lining
- 5-6 ply polyester threads with lock stitching for extra strength
- Outsole is direct injected abrasion resistant anti-slip PU material
- Light weight, one derby shoe weighs only 475gms (lightest in industry)
- Six months guarantee from the date of supply
- Free Door Delivery (within India)
- All sizes available from 5-11

PU Sole-Single

PU Sole-Double

PU Sole-High Ankle

PU Double-High Ankle

Executive Safety

Nitrile Sole

Sports Safety

PVC Sole