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INDIAN SAFETY ENGINEER

QUARTERLY JOURNAL OF SAFETY ENGINEERS ASSOCIATION

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FROM THE DESK OF PRESIDENT

The 63rd Executive Committee meeting of SEA was held on 8th May 2013. The 34th Professional Development Programme was held on 18th May 2013. Our journal “Indian Safety Engineer” for the first quarter 2013 was released in April 2013 and the next issue for the second quarter of 2013 will reach you soon. Hope members would find the monthly ‘Safety Alerts’ that are distributed in electronic form useful. A factory visit was arranged to Madras Atomic Power Station, Kalpakkam on 27th April 2013 and quite a good number of members have participated and were benefited from the visit.



Mumbai Chapter of SEA has conducted their Executive Committee meeting on 8th May 2013. Next Technical Meet is being arranged on 06-07-2013 on two topics, viz., (1) Mech. Seal as a Safety Tool and (2) Awareness about Electrical Safety. Their focus still remains on enrollment of new members. Let us wish Mumbai Chapter for their continued activities.

We are still awaiting for some news on the formation of Delhi Chapter and Hazira Chapter.

SEA and SRU have renewed the MOU for conducting NEBOSH, IGC course at their premises. The 13th Batch of NEBOSH, IGC course is now scheduled on 14th October 2013. We advise members to suggest their respective managements to consider deputing their Safety Officers, Safety Coordinators and Safety Committee Members in this purposeful NEBOSH- IGC Course, towards achieving best safety results in their organisations. SEA will be too happy to extend necessary support and guidance in conducting this course for them.

As you are aware, Top rank holders of each batch of NEBOSH, IGC exams conducted by SEA are recognized by presenting citation and certificate to each of them. Now, as decided in the last AGM, it has been agreed to present similar citation and certificate to the Topper of Diploma in Industrial Safety (DIS) Exams conducted by Regional Labour Institute (RLI), Chennai every year. Topper of 2011-12 batch of DIS exams was presented with the citation and certificate during their diploma distribution function held at RLI on 6th April 2013.

SEA (India) website, www.seaindia.org is now fully functional. Members may advise their Service providers / vendors to advertise their products / services in the exclusive web page available in the site towards bringing in awareness among members.

As requested by Automobile Association of South India, SEA has joined as a member of the ‘Road Safety Federation’ promoted by them.

Membership directory is under preparation. Members are requested to fill up the update forms already circulated to members through email and return them to Secretary / SEA office. For fresh forms, if required, please send your request to SEA office.

Awaiting to meet a good gathering of members during the 13th Anniversary of SEA and AGM scheduled at Chennai on 6th July 2013.

Best Wishes!

S. Ulaganathan

President, SEA (India)

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NEBOSH Course Update

SEA India & Sri Ramachandra University have renewed the Memorandum of Understanding to conduct the NEBOSH course at their premises upto March 2014.

The next batch of NEBOSH course will commence on Thursday, October 14, 2013 and the admission is in progress. To facilitate the resit candidates, the next examination will be conducted on 27th & 28th October (Saturday & Sunday) of 2013 at Sri Ramachandra University.

SEA India encourages its members and other safety professionals to pursue this course to enhance their professional knowledge and career prospects. As the number of seats is limited to 20 only per batch as per NEBOSH regulations, those who are aspiring to join this course are requested to contact the Secretary, SEA India early by mail, info@seaindia.org or paramesh48@msn.com for getting admission.

RLI Topper



Shri S. Senthil Murugan, The First Rank Holder of the Diploma in Industrial Safety Course of the 30th batch (Academic year 2011-2012) was presented Citation and Shield on 6th April 2013 by SEA India during the Second All India Conference of Occupational Safety & Health programme on "Building & Maintaining Occupational Safety & Health Culture".

FACTORIES VISIT TO MADRAS ATOMIC POWER STATION

Factory visit to Madras Atomic Power Station, Kalpakkam was arranged by SEA India on Saturday, 27th April 2013. Around 25 members participated in the visit. The members were taken all round the various parts of the factory, the nature of activities and the best safety practices followed by them were explained. The management of MAPS made elaborate arrangements for the



visit and the visit was very useful for the members. SEA India thank the MAPS management for all the arrangements made and the hospitality.

34TH PROFESSIONAL DEVELOPMENT PROGRAMME

Thity Fourth Professional Development Programme was held on Saturday, 18th May 2013 at USHA Fire Safety Training Hall, Chennai. Large number of SEA (India) members and invitees participated.

Mr. Milind M Harshe, Project Manager, Escalator Plant, M/s. Johnson Lifts (P) Ltd., Oragadam delivered a talk on “Escalator Safety”. Shri J. Manoj Kumar, Installations Manager (Lifts-CMRL) delivered the Technical talk on “Lifts Safety”.

The meet was followed by High Tea and presentation of certificates to the participants. The salient features discussed during the programme is given in this article for the benefit of the members who could not participate in this programme.

ESCALATOR AN OVERVIEW

Escalator is a moving staircase, a device for carrying people between floors of a building. They have the capacity to move large number of people and so is best suited for places like malls, airport, railway stations etc. They are continuous and has no waiting interval.

The steps move at constant pace in an inclined angle and are required to have moving handrails to keep pace with the movement of steps.

Planning Consideration:

A number of factors need to be considered like

- Type of building,
- Physical requirement,
- Traffic pattern,
- Available vertical & horizontal space.

Based on the above, a suitable type and arrangement can be selected.

Major components of an Escalator include:

- Top & Bottom floor plates
- Truss
- Drive Unit
- Brake system
- Steps
- Skirting & Decking



Shri Milind M Harshe, Project Manager, Johnson Lifts (P) Ltd., delivered the Technical talk on “Escalator Safety” during the 34th Professional Development Programme on 18th May 2013.



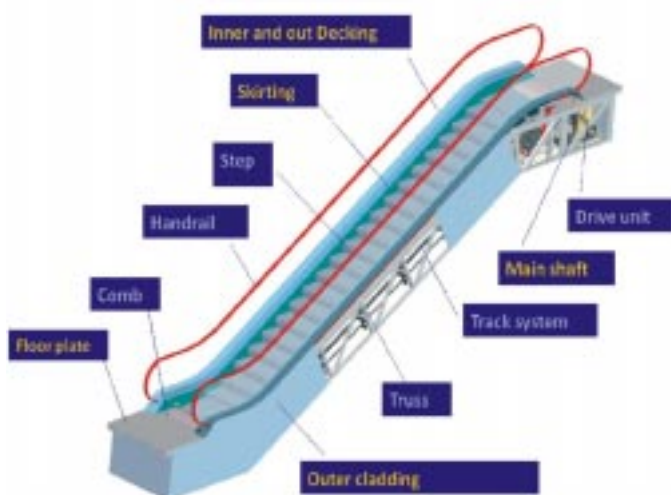
Shri J. Manoj Kumar, Installations Manager (Lifts-CMRL) delivered the Technical talk on “Lifts Safety” at the 34th Professional Development Programme on 18th May, 2013.

- Handrail
- Comb etc.

Safety:

Safety is a major concern in Escalator design. A number of safeties are built in to the system to prevent accidents, like:

Escalator Components



Recommended Safety Symbols



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1. Broken drive chain contact
2. Handrail entrance contact
3. Comb plate impact switches
4. Skirting contact
5. Auto reversal monitor
6. Step missing contact
7. Deflection brushes
8. Safety instructions etc.

Safety Tips:

- Face forward while entering and hold the hand rail firmly.
- Watch your step while entering or leaving and step off quickly on arrival.
- Never use an Escalator barefoot.
- Be careful about loose clothing, hold them carefully.
- Do not lean against the skirting.
- Do not stand close to the skirting.
- Do not place items on the handrail or on the steps.
- Do not ride on the handrail.
- Do not walk or run against the direction of movement.
- Do not use an in-operative Escalator as a stairway.
- Do not hold luggage in both arms while entering an Escalator. Keep one hand free to hold on to the handrail.
- When travelling with a child, hold their hand with one arm and hold on to the handrail with other arm.
- Do not allow children to sit or run on an Escalator.
- Help children and elderly people to step into and off the Escalator.
- Children below 12 years should be accompanied by elders.

OVERVIEW OF LIFTS

Lift:

Lift is vertical transport equipment used for transporting people and materials, between levels of a building or structure, powered by electric motor or by hydraulic means.

A modern day lift consists of a cabin or car mounted on the steel structure called car-sling, and moves inside an enclosed space called lift shaft.

The car is pulled up by steel ropes attached to the car sling which passes over a grooved pulley called sheave and is then connected to a counter weight at the other end.

The sheave attached to the motor, when rotated moves the car up or down. The friction between the rope and the sheave provides the traction, which gives this type of lift, the name.

Initially AC motors were used to provide the drive and in order to reduce the speed, a gear was used. The sheave was mounted to the gear output shaft.

With the advent of frequency drive system an accurate speed control could be achieved and so the gear was eliminated and the sheave is mounted directly to the motor.

A number of safety features are added to the system to give safety and confidence to the passengers travelling inside the lift.

Some of the Major components in a Lift are listed as:

- Traction Machine
- Car & Counter Weight
- Guide & Brackets
- Doors & Door safety
- Suspension ropes
- Speed Governor & Safety
- Limit Switches
- Load Weighing Device

- Signal equipment
- Controller

A number of safeties are provided for the safe travelling of the people.

Major safeties are listed as:

- Over-Speed Governor & Progressive Safety
- Door Safety Sensors & Door Open Key
- Spring Buffer - Car & Counter Weight
- Limit Switches
- Automatic Rescue Device
- Over Load Device
- Emergency Light & Bell
- 3 way Intercom System
- Fire Man Rescue Operation

Lift operations can be performed as following:

- Normal mode
- Maintenance mode
- Automatic rescue mode
- Manual rescue mode
- Emergency operation in the event of fire

Automatic Rescue Mode:

In the event of power failure, the Automatic Rescue Device (ARD) equipped with batteries supplements the power to move the car to the nearest floor in slow speed and opens the door after reaching the level.

Manual Rescue Mode:

When lift gets stuck between landings, in order to rescue the passengers, manual assistance is provided in releasing the brake and rotating the machine to bring the lift to the nearest landing. Doors are then opened manually and passengers are evacuated.

Emergency operation in event of Fire:

In the event of fire, a special switch

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ELECTRIC FLASH

All energized electrical equipment carry the danger of potential arc flash at any moment.

- Each year, more than 2,000 people are admitted to burn centers with severe arc flash burns.
- Arc flashes can reach temperatures of 35,000°F and are fatal at distances up to 10 feet.
- These tremendous temperatures can vaporize metal, resulting in pressure waves that can rupture eardrums and collapse a person's lungs.
- Small pieces expelled from an arc flash can exceed speeds of 700 mph, fast enough to completely penetrate the human body.

ARC FLASH ACCIDENT PREVENTION

Best Practices

The following precautions should be taken before performing electrical work to reduce the probability of an arc flash exposure:

- o Label visual disconnecting devices to identify the circuit they protect.

- Place Warning Labels on the terminal covers of bottom feed circuit breakers stating that the "Bottom terminal lugs remain energized when the circuit breaker is open."
- Determine all possible sources of electrical supply to the specific equipment.

Use single line and schematic drawings to aid in locating any possible secondary sources such as backfeeds, stored energy, or induced voltages.

- ALWAYS wear appropriate Personal Protective Equipment (PPE) as defined in NFPA 70E (Standard for Electrical Safety in the workplace) when doing any electrical work.
- Properly interrupt any load currents, open disconnecting devices for each source.
- Visually verify that all blades of the disconnecting devices are fully open when possible.
- Apply Lockout / Tagout devices in accordance with established policy, your lock is your

PERSONAL key to staying ALIVE! Always use your own lock. Never have someone else do it for you.

- Always TEST to ensure there is no voltage inside an electrical enclosure prior to working on it. Use adequately rated equipment to test each phase conductor phase-to-phase and phase-to-ground. Before and after each test, determine that the voltage detector is operating satisfactorily.
- Ground phase conductors with devices rated for highest available fault duty.
- Consider nearby energized circuits that could possibly contact the de-energized circuit.
- Never assume that you know how a circuit is wired. Ask for help and/or consult a wiring diagram/schematic if you are unsure.
- Avoid standing directly in front of the control box when energizing and de-energizing the electrical circuit. ■

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located at the evacuation floor is manually activated and the lift controlled by the switch cancels all existing calls and comes to the evacuation floor and opens the door. No further calls are registered.

What to do if you are struck in a lift?

1. **Wait for the ARD to rescue the Lift to the nearest Landing.** In case ARD is not available Push the "Door Open" Button. If you are near the landing the door will open. You can slowly and carefully step out of the Lift. Be sure to watch your

step as the Lift's floor may, or may not, be level with the landing.

2. **Remain Calm.** If the door does not open, you are still safe. Do not try to exit the Lift. Wait for trained emergency personnel to arrive. Even if the air temperature feels warm, there is plenty of air circulating in the Lift and its shaft way.

3. **Press the Alarm or Phone Button, and use any available communication systems.**

- Push the alarm button and wait for someone to respond to you.
- In new Lifts, there will be a phone button in addition to the alarm button.

• Some Lifts have a 3 - way speaker system or telephone that will allow for communication between you and the building or rescue personnel.

4. **Relax and DON'T try to extract yourself from the Lift**

- NEVER try to exit a stalled/Stranded Lift car. It is extremely dangerous. ALWAYS wait for trained emergency personnel.
- Your best course of action is to relax, get comfortable, and wait for professional assistance.
- You may be inconvenienced but you are SAFE. ■

OZONE – THE AIR CLEANER

Introduction and Purpose

Ozone generators that are sold as air cleaners intentionally produce the gas ozone. Often the vendors of ozone generators make statements and distribute material that lead the public to believe that these devices are always safe and effective in controlling indoor air pollution.

The purpose of this document is to provide accurate information regarding the use of ozone-generating devices in indoor occupied spaces. This information is based on the most credible scientific evidence currently available.

What is Ozone?

Ozone is a molecule composed of three atoms of oxygen. Two atoms of oxygen form the basic oxygen molecule--the oxygen we breathe that is essential to life. The third oxygen atom can detach from the ozone molecule, and re-attach to molecules of other substances, thereby altering their chemical

composition.

How is Ozone Harmful?

The same chemical properties that allow high concentrations of ozone to react with organic material outside the body give it the ability to react with similar organic material that makes up the body, and potentially cause harmful health consequences. When inhaled, ozone can damage the lungs. Relatively low amounts can cause chest pain, coughing, shortness of breath, and, throat irritation. Ozone may also worsen chronic respiratory diseases such as asthma and compromise the ability of the body to fight respiratory infections. People vary widely in their susceptibility to ozone. Healthy people, as well as those with respiratory difficulty, can experience breathing problems when exposed to ozone. Exercise during exposure to ozone causes a greater amount of ozone to be inhaled, and increases the risk of harmful respiratory effects.

Is there such a thing as “Good Ozone” and “Bad Ozone”?

The phrase “good up high – bad nearby” has been used by the U.S. Environmental Protection Agency (EPA) to make the distinction between ozone in the upper and lower atmosphere. Ozone in the upper atmosphere – referred to as “stratospheric ozone” – helps filter out damaging ultraviolet radiation from the sun. Though ozone in the stratosphere is protective, ozone in the atmosphere – which is the air we breathe – can be harmful to the respiratory system. Harmful levels of ozone can be produced by the interaction of sunlight with certain chemicals emitted to the environment (e.g., automobile emissions and chemical emissions of industrial plants). These harmful concentrations of ozone in the atmosphere are often accompanied by high concentrations of other pollutants, including nitrogen dioxide, fine particles, and hydrocarbons. Whether pure or

Table 1. Ozone Health Effects and Standards

Health Effects	Risk Factors	Health Standards*
Potential risk of experiencing: Decreases in lung function Aggravation of asthma Throat irritation and cough Chest pain and shortness of breath Inflammation of lung tissue Higher susceptibility to respiratory infection	Factors expected to increase risk and severity of health effects are: Increase in ozone air concentration Greater duration of exposure for some health effects Activities that raise the breathing rate (e.g., exercise) Certain pre-existing lung diseases (e.g., asthma)	The Food and Drug Administration (FDA) requires ozone output of indoor medical devices to be no more than 0.05 ppm. The Occupational Safety and Health Administration (OSHA) requires that workers not be exposed to an average concentration of more than 0.10 ppm for 8 hours. The National Institute of Occupational Safety and Health (NIOSH) recommends an upper limit of 0.10 ppm, not to be exceeded at any time. EPA's National Ambient Air Quality Standard for ozone is a maximum 8 hour average outdoor concentration of 0.08 ppm (* ppm = parts per million)

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Ozone

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mixed with other chemicals, ozone can be harmful to health.

Are Ozone generators effective in controlling indoor air pollution?

Available scientific evidence shows that at concentrations that do not exceed public health standards, ozone has little potential to remove indoor air contaminants.

There is evidence to show that at concentrations that do not exceed public health standards, ozone is not effective at removing many odor-causing chemicals.

If used at concentrations that do not exceed public health standards, ozone applied to indoor air does not effectively remove viruses, bacteria, mold, or other biological pollutants.

Why is it difficult to control Ozone exposure with an Ozone Generator?

The actual concentration of ozone produced by an ozone generator depends on many factors. Concentrations will be higher if a

more powerful device or more than one device is used, if a device is placed in a small space rather than a large space, if interior doors are closed rather than open and, if the room has fewer rather than more materials and furnishings that adsorb or react with ozone and, provided that outdoor concentrations of ozone are low, if there is less rather than more outdoor air ventilation.

The proximity of a person to the ozone generating device can also affect one's exposure. The concentration is highest at the point where the ozone exits from the device, and generally decreases as one moves further away.

Can Ozone be used in unoccupied spaces?

Ozone has been extensively used for water purification, but ozone chemistry in water is not the same as ozone chemistry in air. High concentrations of ozone in air, when people are not present, are sometimes used to help decontaminate an unoccupied space from certain chemical or biological

contaminants or odors (e.g., fire restoration). However, little is known about the chemical by-products left behind by these processes. While high concentrations of ozone in air may sometimes be appropriate in these circumstances, conditions should be sufficiently controlled to insure that no person or pet becomes exposed. Ozone can adversely affect indoor plants, and damage materials such as rubber, electrical wire coatings, and fabrics and art work containing susceptible dyes and pigments.

Conclusion

Whether in its pure form or mixed with other chemicals, ozone can be harmful to health.

When inhaled, ozone can damage the lungs. Relatively low amounts of ozone can cause chest pain, coughing, shortness of breath and, throat irritation. It may also worsen chronic respiratory diseases such as asthma as well as compromise the ability of the body to fight respiratory infections. ■

KIND ATTENTION MEMBERS....!

Dear Members,

During the EC meeting held on 8th June 2013, it was decided to update the addresses of the Members of Safety Engineers Association (India) and request you to fill the below mentioned form and send it to us immediately.

Full Name :

Membership No (if Known) :

Type of Membership :

Designation :

Address (Office) :

Address for Correspondence :

Phone (O) :

Phone (R) :

Mobile :

Email :

Members Signature (optional) :

These details are required at the earliest. You can mail these details to SEA (India) @ seaindiachennai@rediffmail.com / safetyengineerschennai@gmail.com

MACHINE SHOP SAFETY AND OPERATIONS PROTOCOL

I. Purpose

This Standard Operating Procedure (SOP) outlines requirements to be considered by an authorized user of the Machine Shop as well as describes the normal operation of the equipment and any hazards that may be encountered during normal operation. Finally, the SOP explains how to minimize any hazards and how to respond in an emergency situation. This document is to be reviewed one year from the date of approval or as conditions warrant, whichever is the shorter time period.

II. Personnel

Authorized Personnel: The Machine Shop may be operated only by authorized personnel who are fully cognizant of all safety issues involved in the operation of such a device. These personnel are to ensure that the equipment is only operated in the manner laid out in this document. To become an authorized user, one must:

- Complete Safety Orientation.
- Read and fully understand the SOP
- Receive training on the equipment by an authorized user.
- Sign the authorized user sheet to affirm that the above steps have been completed.

Unauthorized personnel: No unauthorized personnel may enter machinery area during operations unless accompanied by an authorized user. All visitors must be briefed on proper safety protocol and must wear appropriate protective eyewear located on the premises.

III. Hazards

Safety is not often thought about as you proceed through your daily tasks. Often you expose yourself to needless risk because you have experienced no harmful effects in the past. Unsafe

habits become almost automatic. You may drive your car without wearing a seat belt. You know this to be unsafe, but you have done it before and so far no harm has resulted. None of us really likes to think about possible consequences of an unsafe act.

A) Identifying shop Hazards

A machine shop is not so much a dangerous place as a potentially dangerous place. One of the best ways to be safe is to be able to identify shop hazards before they can involve you in an accident. By being aware of potential danger, you can better make safety part of your work in the machine shop.

B) Eye Protection

Eye protection is a primary safety consideration around the machine shop. Machine tools produce metal chips that may be very sharp, and there is always a possibility that these metal chips may be ejected from a machine at high velocity. Sometimes they can fly many feet.

Eye protection **MUST** be worn at all times in the machine shop. There are several types of eye protection available.

- Plain safety glass- these have shatter proof lenses. The most common type of eye protection worn in the machine shop.
- Side shield safety glasses- these must be worn around any grinding operation.
- Safety goggle- the type that only covers the eyes, or is worn over prescription non-safety glasses.
- The full face shield- most often worn on work producing hot sparks or other flying debris.

C) Foot Protection

Shoes must be worn at all times in the machine shop. A solid leather shoe is recommended. SANDALS

should not be WORN.

D) Ear Protection

Safety regulations are quite strict regarding exposure to noise. Several types of sound suppressors and noise-reducing ear plugs must be worn. Noise is considered an industrial hazard if it is continually above 85 decibels. If it is over 115 decibels for short periods of time ear protection must be worn. Ear muffs or ear plugs should be used wherever high intensity noise occurs. Sudden sharp or high-intensity noises are the most harmful to your eardrums.

Sound level monitoring and assessment is available through Campus EH&S. Contact your Safety Department to schedule an EH&S site visit.

The Decibel level of various sounds

- *Painful sounds:* Jet engines on ground
- *Airplane on ground:* reciprocating engine.
- Boiler factory. Pneumatic riveter.
- Maximum street noise
- Loud shout
- Diesel truck Piano practice
- Average city street
- Dog barking Average conversation
- Average city office
- Average city residence
- One typewriter
- Average country residence
- Turning page of newspaper
- Purring cat
- Rustle of leaves in breeze
- Gastrointestinal out gassing
- Faintest audible sound

E) Grinding Dust and Hazardous Fumes

Grinding dust is produced by abrasive wheels and consists of
(Contd. on next page)

Machine Shop....

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extremely fine metal particles and abrasive wheel particles. These should not be inhaled.

You should wear an approved respirator if you are exposed to dangerous metals, such as beryllium, or the presence of radioactivity in nuclear systems. In these situations, the spread of grinding dust must be carefully controlled. Note that one must obtain proper safety training, health exam, and respirator fit testing prior to using a respirator.

Some metals such as zinc give off toxic fumes when heated above their boiling point. Some of these fumes when inhaled cause only temporary sickness, but other fumes can be severe or even fatal. The fumes of mercury and lead are especially dangerous, as their effect is cumulative in your body and can cause irreversible damage. Cadmium and beryllium compounds are also very poisonous.

F) Clothing, Hair, and Jewelry

Avoid entanglement with the moving parts of the machinery.

Wear short-sleeved shirt or roll up long sleeves above the elbow. Keep your shirt tucked in. It is recommended that you wear a shop apron. If you do wear a shop apron, keep it tied behind you. If apron strings become entangled in the machine, you may be reeled in as well. A shop coat may be worn as long as you roll up long sleeves. Do not wear fuzzy sweaters around machine tools.

If you have long hair, keep it secured properly. In industry, you may be required to wear a hair net so that your hair cannot become entangled in a moving machine. The result of this can be disastrous.

Remove your rings before operating any machine tool. These can cause serious injury if they should be

caught in a moving machine part.

G) Hand Protection

There is really no device that will totally protect your hands from injury. Next to your eyes, your hands are the most important tools that you have. It is up to you to keep them out of danger. Use a brush to remove chips from a machine. Do not use your hands. Chips are not only razor sharp, they are often extremely hot. Resist the temptation to grab chips as they come from a cut. Long chips are extremely dangerous. These can often be eliminated by properly sharpening your cutting tools. Chips should not be removed with a rag. The metal particles become imbedded in the cloth and they may cut you. Furthermore, the rag may be caught in a moving machine.

Gloves must not be worn around most machine tools, although they are acceptable when working with a hand saw blade and when removing sharp chips from lathes and mills. If a glove should be caught in a moving part, it will be pulled in, along with the hand inside it.

Various cutting oils, coolants and solvents may affect your skin. The result may be a rash or an infection. Avoid DIRECT contact with these products as much as possible and wash your hands as soon as possible after contact.

H) Lifting

Improper lifting can result in a permanent back injury that can limit your physical activity the rest of your life. Back injury can be avoided if you lift properly at all times. If you must lift a large or heavy object, get some help or use a fork lift. Don't try to be a "superman" and lift something that you know is too heavy. It is not worth the risk.

Objects within your lifting capability can be lifted safely by the

following procedure:

- Keep your back straight.
- Squat down, bending your knee.
- Lift smoothly, using the muscles in your legs to do the work. Keep your back straight. Bending over the load puts an excessive stress on your spine.
- Position the load so that it is comfortable to carry. Watch where you are walking when carrying a load.
- If you are placing the load back at the floor level, lower it in the same manner you picked it up.

I) Carrying objects

If material is over six feet long it should be carried in the horizontal position. If it must be carried in the vertical position, be careful of light fixtures and ceilings. If the material is both long and over 25 kg in weight, it should be carried by two people, one at each end. Heavy stock, even if it is short, should be carried by two people.

J) Scuffling and Horseplay

The machine shop has no place for scuffling and horseplay. This activity can result in serious injury to you, a fellow student, or worker. Practical joking is also very hazardous. What might appear to be a comical situation to you could result in a disastrous accident to someone else. In industry, horseplay and practical joking are often grounds for dismissal of an employee.

K) Compressed Air

Most machine shops have compressed air. This is needed to operate certain machine tools. Often flexible air hoses are hanging about the shop. A large amount of energy can be stored in a compressed gas such as air. When this energy is released, extremely danger may be present. You maybe tempted blow

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Machine Shop....

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chips from a machine tool using compressed air. This is not recommended. The air will propel metal particle at high velocity. The can injure you or someone on the other side of the shop. Use a brush to clean chips from the machine. Do not blow compressed air on your clothing or skin. The air can be dirty and the force can implant dirt and germs into your skin. Air can be a hazard to ears as well. An eardrum can be ruptured. A broken air hose will whip about wildly and may cause injury if you happen to be standing nearby and are struck.

L) Electrical

Electricity is another potential danger in a machine shop. Your exposure to electrical hazard will be minimal unless you become involved with the machine maintenance. A machinist is mainly concerned with to on and off control switch on a machine tool.

M) Machine Hazards

There are many machine hazards. Remember that a machine cannot distinguish between cutting metal and cutting fingers. Do not think that you are strong enough to stop a machine should you become tangled in moving parts. **YOU ARE NOT.** When operating a machine, think about what you are going to do before you do it.

IV. Normal Operation

S.No.	Name of the employee	Date	Signature	Supervisor's Sign

The operational procedures for each piece of equipment may be attached to the back of this document or will be on file in the machine shop SOP instruction manuals.

V. Emergency Procedures

A) Injuries: If you should be injured, report it immediately to your supervisor.

B) Power outage: If there is a power outage, turn off the equipment to avoid a hazardous situation when power is restored. It is advised that all personnel in the machine shop exit the shop area until proper lighting is restored.

C) Earthquake: If there is an earthquake, turn off the equipment and immediately take cover either beneath a table or door frame. Avoid areas where equipment and materials may fall, dislodged, or become projectiles. When the shaking has subsided, check for the safety of others and yourself, and if possible exit the building immediately.

D) Emergency Evacuation Alarms: If there is an emergency alarm, turn off the equipment immediately, check for other occupants in the machine shop, exit the building immediately, and report to the building evacuation staging area located in the front of the building.(Assembly Point)

Authorized Users

I have read and understood the Standard Operating Procedures for

the Machine Shop.

Appendix A - SHOP CLEAN UP POLICY

At the end of your work time you are expected to clean up the machines you worked on including the area around them: base, chip pans, etc.

Each drill area must be left clean, so if you drill a hole on the drill press, and then go to use the mill you must clean the drill press first, before you use the mill.

After using a machine, tear down all setups and return the machine to its standard setup. Milling machines should be left with a vise securely mounted on the center of the table.

The machine shop is a potentially dangerous environment. By following a few safety rules and applying a lot of common sense you will be able to safely produce quality machine work. We encourage you to plan your machining tasks before you come into the shop. Think before you cut! We also encourage you to take your time in the shop. You will find that if you work slowly and carefully you will obtain the desired results more quickly than if you hurry. The following is a list of shop rules to help you safely produce machine work of consistent quality.

Federal and state laws require safety glasses be worn at all times in the shop area. All corrective glasses with the exception of contact lenses provide adequate eye protection. Glasses must be worn whenever you are in the shop regardless of whether you are working or not. Laser safety glasses and sunglasses are not acceptable safety devices because of their tinting.

To safely work in the machine shop, you need to be properly dressed. You must wear closed shoes on your feet to protect you from falling objects and metal chips. Sandals are not acceptable. Also long sleeves must be rolled up and long hair tied up or contained in a cap so they do not become caught in any rotating machinery. Rings should be taken off. Gloves are not allowed to be worn in the shop except for handling dirty or

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Machine Shop....

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sharp material. They are never to be worn when running any machines. This also includes rubber gloves.

It is strongly recommended that a minimum of two people be present in the student shop in case there is an accident. If you need to work late at night or on the weekend and it is not possible to have someone accompany you, let someone know where you are going and when you plan to return. Be sure that all people you bring in to the shop with you have safety glasses, appropriate shoes, and that they know where the emergency power shutoff switch, the fire extinguisher and the phone are located.

The machine shop is not a place to experiment. Since the machine shop is a potentially dangerous environment no operations that you are not entirely sure will work, should never be tried. If you are not absolutely sure you know what you are doing, ask.

As a user of the machine shop it is your responsibility to immediately tend to any potentially dangerous situation that you come across regardless of whether or not you have caused it. Encourage your shop-mates to wear safety glasses. Clean up spilled oil by spreading oil sorb on the spill.

Chips should be removed from the t-slots of the table. Lathes should be left with an empty collet chuck or three-jaw on the spindle. Nothing should be in the tailstock and the cutting tool should be removed from the tool post.

Brush all of the chips off the machine and place them in the trash. Do not use compressed air for this. Once most of the chip is removed go ahead and blow the ones you missed on the floor. When the chips are removed, wipe all oil and dust from the machine with a rag. Be sure to clean the chip pan or the lather and the base of the mill. Then sweep the floor around your work area and throw the sweeping into the trash.

If the supervisor determines that any person neglected to clean a machine or

shop area that he or she was using, that person must immediately return and perform the required cleanup to the supervisor's satisfaction.

Appendix B - PROCEDURE FOR MACHINE SHOP ACCIDENTS

In the event of a machine shop accident, follow the procedure below:

- Ensure that the machine is shut off.
- Provide for the safety of the personnel (first aid, evacuation, etc.) as needed. Note - if an eye injury is suspected, have the injured person keep his/her head upright and still to reduce bleeding in the eye. A physician should evaluate machine injuries as soon as possible.
- Obtain medical assistance for anyone who may be injured.
- If there is a fire, pull the alarm, and contact the fire department by calling from a cell phone. Do not fight the fire unless it is very small and you have been trained in fire fighting techniques.
- Inform the Office of Environment Health, & Safety (EH&S) as soon as possible.
- After the incident, do not resume use of the machinery until the EH&S has reviewed the incident and approved the resumption of work.

Appendix C - IMPORTANT FACTORS TO REMEMBER

1. All shop users are responsible for cleanup as described below.
2. Do not walk out of arms reach of a running machine.
3. Report any broken or missing tools to BNC Director or supervisor, so they can be repaired. Never use anything but sharp, unbroken tools. A dull tool requires higher cutting forces to do the same work as a sharp too. Increased force causes accidents and damaged work pieces.
4. All work must be securely clamped in the machine before any work is done.

5. Resist the temptation to pull chips away from the cutter with your fingers. They are sharp and hot. If you must remove the chips use a pair of pliers.
6. Never blow compressed air into a large pile of chips. Use a brush to remove most of the chips than blow. Never blow air towards another worker. Never blow compressed air onto your skin or hair.
7. Do not grind non-ferrous material on the grinder. It eventually causes the grinding wheel to crack and fly apart. The grinder is for sharpening cutting tools only. Use the belt sander if you want to grind something that is not a cutting tool. When turning the grinder on do not stand directly in front of the wheels, wait until they have come up to full speed. Never ever clean any grinder or sander with compressed air!
8. Lathe and drill chuck keys must never be left resting in a chuck.
9. Do not leave a machine set up and unattended for any longer than a half hour without the consent of the shop supervisor. If left for longer the set up will be torn down when the machine is needed.

Appendix D. GO OVER SAFETY CHECK LIST

1. Do I know how to operate this machine?
2. What are the potential hazards involved?
3. Are all guards in place?
4. Are my procedures safe?
5. Am I doing something that I probably should not do?
6. Have I made all the proper adjustments and tightened all locking bolts and bolts?
7. Is the work piece secured properly?
8. Do I have proper safety equipment?
9. Do I know where the STOP SWITCH is?
10. Do I think about safety in everything I do? ■

CASE STUDY

CASE STUDY 1:

WORKER KILLED BY COLLAPSED REINFORCED CONCRETE PILE

Location: Construction site

WHAT HAPPENED:

A construction worker was hacking a reinforced concrete (RC) pile at the basement level of a building, which had been excavated. The soil behind the RC pile loosened and slipped down due to the absence of shoring (a safety measure required to prevent soil collapse in an excavation site). This resulted in the subsequent collapse



Deceased hit by collapsed RC pile

of the RC pile that had been fully hacked thorough, and the collapsed RC pile fell onto the worker, thereby killing him.

ROOT CAUSE FOR THE ACCIDENT:

Loose soil and the collapse of the soil is the root cause for the accident.

REMEDIAL ACTION:

The employer should ensure the safety of workers performing

excavation works.

Risk Assessment with specific reference to the tasks has to be carried out.

The hazards identified should be thoroughly monitored by competent person so as to ensure safety. The hazard identification should include soil movement resulting from excavation and hazards posed by the machines used, collapse of excavation, falling into the excavation, checking the integrity and strength of any retaining structure prior to excavation.

All foreseeable workplace hazards are to be identified and effective control measures are to be put in force which has to include development of safe work procedures, providing shoring at the excavation site as well as ensuring adequate worker supervision.

Regular safety briefings may also be resorted to before entry into an excavation.

- Conduct regular safety briefings before entry into an excavation.

CASE STUDY 2:

EXPLOSION IN FOUNDRY

WHAT HAPPENED?

The accident took place in a foundry where manufacture of cast iron parts used in the automobile industry, the building industry, heating installations, mechanical industry, farming etc. were carried on with an employment of around 300 employees..

On an annual basis, the foundry produces approximately 25,000 Tonnes of grey cast iron and 15,000 Tonnes of spheroidal graphite (SG) cast iron.

Grey cast iron is produced using a cupola furnace, while the SG cast iron process involves electric ovens.

The involved unit:

The melting workshop involved in this accident comprises among other equipment two cupola furnaces each with a maximum production capacity of 150 tonnes/day. These furnaces are supplied with coke and operate in alternation every other day for periods extending at most 16 hours.

The various manufacturing stages include:

Stage	Operational details
Load preparation	Mixing of alloy component elements Transfer onto the furnace loading platform
Cast iron melting	Introduction of load via a bridge crane / skip Melting of the load in either the cupola furnace or an induction furnace Slagging (manual removal of impurities)
Discharge	Emptying of ovens or cupola furnaces using a ladle
SG processing	Introduction of an alloy (iron-silicon-magnesium) in molten cast iron
Casting	Casting in the moulding machine: -mould installation -sand filling -compression and formation of the sand mould -manual or automatic ladle casting
Cupola drop	Discharge (once a day) from the cupola furnace bottom of molten residue (slag, cast iron, coke) into a heat-resistant skip
Shake-out	Separation of the parts and sand moulds using a vibrating belt
Finishing	Mechanical treatment of parts: shot-blasting, grinding, heat treatment

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Case Study

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The accident:

An explosion occurred on Monday, corresponding to the time of a cupola drop. The door located on the lower section of the cupola furnace was opened as for discharging the products remaining once the melting process was completed (incandescent coke, cast iron and slag residue) into a skip set up below the furnace. This metallic receptacle was lined with refractory cement.

An employee was positioned at a distance of 10 metres from the skip as a precaution to control any eventual fire outbreak.

The explosion took place at the time the molten residue was being dropped into the skip.

Consequences of the accident:

Pieces of coke, cast iron and slag were projected inside the building. Emergency response units were notified and company personnel evacuated and then reassembled at premises located beyond the danger zone. External fire-fighters secured the damaged zone and oversaw the safe evacuation of all personnel.

The employee positioned 10 metres from the cupola drop zone was burned on the face and arms by the hot air blast of the explosion, necessitating a 4-day hospital stay; a second employee, found in a state of shock and treated onsite by the fire-fighting crew, was able to report for work two days hence.

The roof was destroyed over a 30 m² area resulting in huge property damage, however installation of the cupola furnace sustained no damage whatsoever; production

could thereby resume the next day according to the regular schedule and under normal operating conditions.

The explosion blast caused dust that had accumulated on the metal frame of the building to fall to the floor. The zone damaged by the explosion was quickly cleaned. No rainfall was recorded at the time of this event, which served to avoid any runoff of contaminated stormwater to the soil. Moreover, no fire extinction water needed to be sprayed.

The probable cause for the accident:

The projection of molten metal due to either the contact between water and metal or the formation of a gas accumulation (CO / H₂) is the probable cause for the accident. Such projections are capable of initiating a fire.

The water / molten metal reaction can cause this accident: the refractory cement lining the residue recovery skip was only set into place the same morning and the drying period proved insufficient. This skip, intended to serve as a receptacle for residue after melting, contained residual humidity. Water entering into contact with molten residue either triggers a vapour explosion (purely physical phenomenon) or leads to the formation and subsequent explosion of hydrogen or CO (chemical redox phenomenon).

Remedial Measures:

1. Technical Measures:

o Removal of humidity in the metal skip, for the purpose of eliminating the risk of explosion due to contact between residue after melting (cast

iron residue) and water, i.e. acquisition of three skips so as to better manage equipment utilization and ensure sufficient drying time for the refractory cement (36 hrs).

- storage of this containment capacity at a site protected from water;
- drying of the skip intended for daily cupola drop using a gas burner;

2. Organisational measures:

- The number of individuals working in the hazardous (so-called "protection") zone where the cupola drop takes place can be minimized.
- clearly identifying the protection zone by demarcating The boundary around the cupola furnace can be protected by clear demarcation.
- A sound alarm designed to notify personnel during the cupola drop period can be installed.
- Designating a cupola supervisor with the responsibility to trip the alarm and ensure that the protection zone is always free of any unprotected or unauthorised individuals can be considered
- The head of operations may be advised to periodically verify that the refractory cement lining the skip is well dried.:
- The Supervisor may further ensure that all concerned work men wear protective gear such as helmet with a face shield, safety jacket and aluminised gloves, and appropriate pants during foundry work. ■

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IN THE NEWS

900 Electrical Accidents in Tamilnadu

The number of electrical accidents in the state was about 900 in 2012-2013 according to the Chief Electrical Inspector to Govt of Tamilnad. He has further said the fatal and nonfatal accidents were slightly higher than the previous year.

The state had more than 7500 HT consumers (Industrial & Commercial). Inspectors conduct mandatory inspections once a year in all these installations. Inspectors are given instruments to measure power supply, leakage etc during inspections.

As regards increase in the use of new equipments & gadgets in buildings, he said to ensure safety, Industries & commercial establishments should engage electrical contractors with licence, electricians & helpers who are certified and also got the approval from the Electrical Inspectorate for installations.

The use of standardized products and involving contractors would help in bringing down accidents.

For instance, in the case of uninterrupted power supply system, the selection of battery & the location of the system in a building are important.

When the electrical design is prepared for a building, provision should be made for future needs. Engaging a contractor with licence would ensure that these safety measures are adopted.

When companies add new gadgets in their units, they should report it to the Tamilnadu Generation & Distribution Corporation (TNGEDCO).

The Inspectorate gives Safety Certificates for generator (above 10 KVA) installations and monitors the electrical installations in high tension units and multi storeyed buildings.

Source: The Hindu

Use of nuclear power prevents air-pollution deaths, greenhouse gas emissions: Study

The use of nuclear power has led to prevention of 1.84 million air pollution-related deaths globally and has also prevented the release of 64 billion tons of greenhouse gases that might have erupted from burning coal and other fossil fuels, a new study has revealed.

Pushker A. Kharecha and James E. Hansen from the International Energy Agency have said that nuclear power has the ability to aid in controlling of both global climate change and illness and death associated with air pollution.

Both the researchers analyzed nuclear power's benefits in reducing carbon dioxide emissions and air pollution deaths keeping in mind Fukushima accident in Japan that could overshadow the benefits of nuclear energy.

The study based upon calculations of prevented mortality and greenhouse gas emissions for the period 1971-2009, confirmed that nuclear power can prevent deaths from 420,000 to 7 million by mid-century, and prevent emission of 80-240 billion tons of the greenhouse gases linked to global warming.

The study that appeared in the ACS journal Environmental Science and Technology further proved that large-scale expansion of unconstrained natural gas use will not help in mitigating the climate problem and will cause far more deaths than the expansion of nuclear power.

ILO calls for Global action to fight workplace diseases

On Sunday, April 28, 2013, World Day for Safety & Health at workplace, the International Labour Organization (ILO) has called for an urgent and vigorous global campaign to tackle the growing number of work related diseases, which claim an estimated 2 million lives a year.

In a statement, the ILO Director General said that the ultimate cost of occupational diseases is human life. He further said, "Occupational Diseases impoverishes workers and their families and may undermine whole communities when loose their most productive workers. Meanwhile the productivity of enterprises is reduced and the financial burden on the state increases as the cost of health care rises. Where social protection is weak or absent, many workers as well as their families lack the care and support they need. Prevention is the key to tackle the

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IN THE NEWS

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burden of occupational diseases and it is more effective & less costly than treatment and rehabilitation”.

He added that ILO was calling for a paradigm of prevention with comprehensive and coherent action targeting occupational diseases, not merely injuries.

Further a fundamental step is to recognize the framework provided by ILO's International Labor Standards for effective preventive actions and promoting their ratification and implementation.

In his remarks on the World Day, the head of the International Organisation of Employers (IOE) said:

“The ILO is well placed to lead a concerted and holistic effort to address Occupational Safety and Health challenges by providing integrated web based information that is practical and easily accessible to work place actors, prevention and treatment centres, employers and workers organization, enforcing authorities and Labour Inspectorate”.

General secretary of the International Trade Union Confederation (ITUC) said “Our societies must not accept that workers can lose their health to make a living. And we must not forget that occupational diseases put a huge burden on families and the public purse- a burden that is preventable. Harnessing the knowledge of workers backed by their unions is crucial for preventing deaths and illness. Protection including through respect for workers, right to trade union representation and Government legislation and Enforcement following ILO standards and guidance should be expanded.”

SEA (INDIA) - MUMBAI CHAPTER ACTIVITIES

SEA (India) Mumbai Chapter meeting was held on 18th May, 2013 at Mumbai. The minutes of the meeting is given below for the information of all members.

1. Dr. Pant welcomed the working committee members as well as the new members who had expressed their willingness to join the committee.
2. Meeting started with Safety contact from Reliance team. Few key Information on driving safety was shared with the members.
3. The committee discussed on the new members, who have shown their interest to join the SEA-India - Mumbai Chapter working committee. As Mumbai chapter has few vacant positions due to the movement of Mr. Jayakumar and Mr. Sridher from Mumbai region, it was decided to replace them with new members. Secretary to ensure our new member Mr. Kale, completes all required formalities before he can take-up this responsibility.
4. Following members will be part of the new working committee for the year 2013-14.
President - Dr. Pant, Reliance Industries Ltd.
Vice President - Mr. S.V. Kale, Tata Power (New)
Secretary - Mr. P.A. Murali, Clariant Chemicals (India) Ltd.
Joint Secretary - Mr. Balachandran, Total Oil India Ltd. (New)
Treasurer - Ms. Sneha Sriram, Fugro India Limited.
Member - Mr. Ninadh Chikhlikar, Sodexo
Member - Mr. Thiyagarajan, L&T Power (New)
5. Dr. Pant while welcoming the new members expressed the need to increase membership of Mumbai Chapter, to have more active involvement and sharing of knowledge among the professionals. He expressed the composition of our Mumbai chapter should not only consist of Safety professionals, but should also include Regulators (Retired and Active), Fire professionals and students pursuing the safety profession.

6. Members shared a number of ideas to increase the current membership level. A Few options agreed were :
 - a. Member get members. Each member should Identify atleast 5 more members who can join the forum.
 - b. Student members : Discuss with TBIA and other safety professional institutes. Share SEA-India presentation and prepare some write-up, which can be displayed at these institutes.
 7. Check with HQ, whether any concession can be given to the new student members who are interested in joining the forum.
 8. Dr. Pant suggested we also update the current Mumbai chapter membership details, as the last update was done in 2011. Contact HQ to get the latest list of all active members of the Mumbai region.
 9. Discuss with HQ for issue of SEA Member card for all the members of the Mumbai region.
 10. Discuss with HQ for receiving Safety Flash and Quarterly Safety Journal to all the members as some of the members felt they do not get the update.
 11. Get latest update of the Membership fee requirements for all category of memberships. This should be reflected in the Mumbai application form.
 12. It was decided to have the next technical meeting at Total Oil India Limited.
 13. The meeting concluded with a vote of thanks from Mr. Murali for the active participation and contribution of the committee members.
- The next meeting will be held on 6th July, 2013 at Total Oil India Limited. The topic of discussion would be:
1. Mech. Seal as a Safety Tool - Faculty Mr. D.V. Kulkarni (Time duration - 30 minutes)
 2. Awareness about Electrical Safety - Faculty Mr. J.G. Khadiikar (Time duration - 45 minutes)



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