INDIAN SAFETY ENGINEER

QUARTERLY JOURNAL OF SAFETY ENGINEERS ASSOCIATION

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

G1, Vinoth Foundations, 95/5, Sundaramurthy Gramani Street, Virugambakkam, Chennai-600092.
Tel : 044-2377 4060 E-mail: info@seaindia.org Website: **www.seaindia.org**

VOL: 14 No. 3 **JULY – SEPTEMBER 2015**

SAFETY PROFESSIONALS MEET

Thiru Kumar Jayanth, IAS, Secretary, Labour & Employment, Government of Tamilnadu being welcomed by **Thiru C Gnanasekara Babu Rao** to the **"Safety Professionals Meet and interaction with Regulatory Authorities"** conducted by SEA India, Department of Industrial Safety & Health, Government of Tamilnadu and Regional Labour Institute, Government of India. **Dr R K Elangovan,** Director, RLI is on the right.

Thiru Kumar Jayanth, IAS, delivering the valedictory address

(contd. on page 15)

Inside...

Printed at Sunitha Printers, Chennai – 600 002

41ST PROFESSIONAL DEVELOPMENT PROGRAMME

FROM THE DESK OF PRESIDENT

Dear Members,

Greetings to all of you!!

After hectic activities relating to Safety Professionals Meet, 2015 and 14th Anniversary celebrations of SEA during July 2015, routine activities relating to establishing new SEA Office and other routine activities are in progress.

Professional Development Programme on "HSE Challenges in Occupational Health & Hygiene" by Dr. S. Jayaraj was held on 30-08-2015. The 80th Executive Committee meeting of SEA was held on the same day. Our quarterly journal "Indian Safety Engineer" and the monthly 'Safety Alerts' are brought out and distributed to Members periodically. We are trying to organize a Factory visit programme shortly.

One day workshops on select HSE topics are considered to be held in collaboration with the EHE Department of Sri Ramachandra University. The topics are expected to be very useful to safety professionals and will give the participants hands on experience in getting more clarity on the subject.

Mumbai Chapter of SEA had their Technical Meet on 11th July 2015. Chief Fire Officer, Thane Fire Brigade made a presentation on "Safety in High Rise Buildings". Participants have brain stormed on different topics that will be considered for future technical meet programmes. Their next technical meet programe is scheduled for September 2015.

Students Chapter at Anna University, Chennai is active and most of the members participate in our Technical Meet programmes and get benefitted. As requested by them, guest lectures on select topics covering their semester syllabus have been delivered by experts from SEA.

Shortly, Poojas and festivals are coming in and time for people to rejoice and celebrate. Request safety professionals to do their mite in educating Offsite safety aspects to be followed during these days to their fellow employees, friends, and families.

Best Wishes and Seasons Greetings!

S. Ulaganathan
President, SEA (India)

OCCUPATIONAL HEALTH: 'CHALLENGES TO DIAGNOSE-INVESTIGATE-TREAT OCCUPATIONAL DISEASES'

Dr. G. JAYARAJ*

The 41st Professional development Programme was held on Sunday 30th August 2015 at Chennai. **Dr S Jayaraj,** Retd Medical Officer, NLC Chennai delivered the technical talk on **"Challenges in Occupational Health & Hygiene".**

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

The talk was followed by distribution of certificates to participants and lunch.

Salient features of his talk is given for the benefit of members who could not attend this programme.

"Occupational diseases are generally chronic in nature, whereas Occupational injuries are more acute. Both are the most easiest to prevent, but difficult to treat. As in many parts of the world, 'health' is synonymous with curative services, Prevention has the least priority. Occupation related health disorders fall under the prevention category".

World is going toxic and the people today live in a toxic environment. The environment is loaded with thousands of toxic substances, metals, chemicals, liquids, gases around the universe, making it impossible to stay away from these hazards. Toxicity is of much greater concern in this century than ever before. The air, soil and water are becoming increasingly polluted. This exposure, along with the common use of eating non-nutritional foods, failing to exercise, drink enough water has resulted in a toxic storehouse creating a wide range of symptoms and diseases.

Understanding of Occupational Diseases have always been on the existing facts and findings, based on the past experiences. Hence there is lack of knowledge to share on the changing pattern of diseases and disorders due to current hazards. Epidemiology is known to be always late. The new illnesses AIDS, Ebola, SARS etc., take upper hand as epidemics. By the time they are approached with new alternatives, some other unknown diseases / disorders start invading the society.

There is a new waves of Life Style disorders as epidemics. The increasing non-communicable disorders trends viz. Diabetes, Cardio Vascular Diseases, Musculo-Skeletal Disorders (MSDs), Autoimmune disorders etc., are now much challenging. Communicable diseases due to infective agents like bacteria, virus have drugs to treat and control. But Non-communicable disorders have no satisfactory solutions yet. Fresh information, knowledge and skill need to be generated both among people and medical fraternity to manage such disorders. Medical team has limitations to control and treat these illnesses arising out of occupations. The practicing doctors often do not have the right information, knowledge-skills and time-tools to fully understand the differently growing health issues. Among these, Occupational Disease appear to be one.

Disorders due to chemicals and metals are of two extreme, either acute or chronic in nature. Emergency care for acute illness has standard approach of critical management to save lives, relieve victims from short term symptoms and injuries. On the other hand the chronic poisoning is very slow in the process to cause disorders, often many years for the symptoms of illness to come up. When the symptoms surfaces, most of the bodily damages had already been done. Reversing such illness at later stage, controlling further complications or treating them would be difficult or impossible.

Heavy metal poisoning and toxicity lead to the accumulation of toxins in our tissues and organs causing irreparable and irreversible damages, nutritional deficiencies, hormonal imbalances and the breakdown of the immune system, eroding the central

***Dr. G. Jayaraj, MBBS, DIH, DIS, MBA, M.Sc (Occupational Medicine-UK), Ph.D, Diplomate of National Board (Occupational Health), Professor, Researcher, Writer to promote health among the workforce in industries.
He may be contacted @ contact@occupationalhealthindia.com

(Contd. on next page)

Occupational....

(Contd. from previous page)

nervous system, and several vital the organs. The population in general have some form of chemical and metal poisoning, including solvents, mercury, lead, arsenic, cadmium, aluminum and nickel etc. They change the structure of DNA and RNA.

This breakdown of bodily organs and systems will end up with numerous diseases and disorders. It is important to know some of the early signs and symptoms of environmental toxicity so that one can take action to prevent at the stage of exposure itself or limit the disorders without causing disabilities.

Chronic exposure to toxic chemicals and metals, can damage the immune system and other cells in the body, leading to variety of disorders and symptoms, including autoimmunity. Occupational Diseases are primarily preventable, but rarely curable. Physician can be proactive and participative in prevention process, but rarely are they. Prevention has never been a priority in the medical practice. Primary role of prevention is also vested with the Employers of industries, who are responsible not only for manufacturing products of community value, but also knowingly or unknowingly the promoters of diseases related to occupation. Unless otherwise the Employer initiate measures to prevent hazards at workplaces, the Employees will do next to nothing to protect his Health. Occupational Health Physicians, practicing medicine in industry, have very limited role both in prevention and treatment of occupational diseases. However, the physician's moral responsibility lies not in treating illness, but more in knowing the workplace hazards, work in close liaison with shop-floor engineers, safety managers, HR officials, employers in the prevention process.

The main component of Occupational Health is to primarily research related and understanding how the working conditions affect worker health. This discipline also, to evaluate the effectiveness of interventions that improve and/or protect worker health. Establishing causation is the most important part of an occupational disease care, which is not an easy task to accomplish. In order to be entitled for compensation of occupational diseases under worker's compensation law, one must prove that the condition arose out of employment. This should not be misconstrued to encompass conditions of natural origin that just happen to become problematic at work.

Of late, the Psychological distress at job is often expressed in affective, psychophysical or psychosomatic and also as anxiety symptoms. Job dissatisfaction is growing at breakneck speed in the present era of automation play disastrous role generating several health disorders. Working conditions, Economic insecurity, Work and Family, Drug Abuse, Workplace bullying, Workplace incivility, Sexual harassment, Workplace violence, Homicide, Nonfatal assault etc., play vital role for mental ill-health, a the place of work. Common ailment of headaches, stomach aches, fatigue, insomnia etc. not amenable to conventional treatment is the order of the day. The relation of adverse working conditions to psychological distress is thus developing as a sub-discipline in the medical practice. ■

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 sent 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

SAFETY PROFESSIONALS - CHALLENGES FOR 2015

Special Technical Meet was arranged during the Fourteenth Anniversary Function of SEA India held on 4th July 2015 at Chennai.

Mr G Francis Arulandam, A G M & H O D-H S E Design, Petrofac Engineering Services (I) Ltd, Chennai delivered a Technical talk on **"Challenges faced by Safety Professionals".**

Salient features of his talk is given here for the benefit of members who could not attend his talk.

Safety professionals do not have an easy job. When they succeed nothing happens, when they fail someone gets hurt. It takes a will of steel and a huge amount of positivity to take on such a role. In addition, even when the safety regime in a company is clearly articulated and policed the EHS manager is reliant on their staff and contractors to adhere to policy. A recent report from ISHN entitled, "2015 EHS State of the Nation", puts this quandary as the Number 1 challenge that EHS managers will face in 2015.

The survey was taken from safety professionals, managers and plant managers in large companies - 500+ employees worldwide - and took place over December 2014. Respondents tended to be from hard-hat industries such as oil & gas, construction and manufacturing.

45% of pros say that employee discipline will be their biggest challenge this year

Compliance is a two-fold concern for safety professionals as, on the one hand, there is the challenge of getting training completed and logged but also there is the compliance challenge of ensuring that staff will implement this training. How do managers instil in all employees the imperative of safety processes? This is a difficult one to answer but it comes down to creating and maintaining a safety culture throughout the company. Building this means winning the hearts and minds of management and staff alike. Companies that have built strong safety cultures have found that continuous training is essential and strong visible backing from all management together can create the conditions in which workers start to see safety culture as something that is valuable in and of itself rather than just as a means to an end. Companies like Shell have been proactive in this area with their Goal Zero campaign to operate without any fatalities despite working in very challenging environments.

3 in 5 say safety training of employees is their most pressing goal for 2015

Delivering relevant safety training to employees is clearly an ongoing concern for safety professionals. It is not sufficient to give training just at the beginning of an employment. Training must be delivered in response to changing work practices and technologies. However, with challenges such as dispersed worksites, inconsistent training and a lack of testing of workers safety professionals are hard pressed to get this training over the line successfully. Face-to-face training is a great way to deliver information but advances in online training platforms are quickly taking over from the pressures of face-to-face with a more streamlined approach that builds testing and record keeping into the process from the start. Ask any safety officer what the ultimate goal is for their safety training program and they will tell you it is to have all staff and contractors trained and tested in advance of starting work. Luckily that is an achievable goal in 2015 with software solutions where face-to-face used to be the only option.

Employee safety and health engagement and accountability is a 2015 goal for 54%

Like I have said, central to employee engagement and account-

(Contd. on next page)

Safety Professionals....

(Contd. from previous page)

ability is the building of a safety culture in an organisation. However, achieving employee engagement can be done in a variety of ways.

- Regular safety meetings and updates are very important. They can be done either formally or informally.
- The use of mentoring programs in a company is one which engages both the mentor and mentee with safety and have been proven to increase accountability as the safety relationship is personal rather than between worker and management.
- Near miss reporting involves all workers in the safety reporting process and highlights danger points in a worksite.
- Safety drills can help to reinforce safety training. Most workers are familiar with the fire drill and being ready to act in that event but it is also possible to build safety drills that are specific to your worksite, eg, fall protection drills, accident drills and so on.
- Finally, there is no harm in always having a Suggestion Box on site to get feedback from workers on how things can be improved. These are just a few ideas that, if implemented, could make a big difference to employee engagement with health and safety in the workplace.

36% say a goal in 2015 is senior leadership safety and health engagement / participation / accountability

There is no doubt that all safety professionals want the full backing and support of senior management but their engagement and participation is not the most pressing issue when it is the workers themselves who are on the frontline of workplace incidents. That said, nearly 2 in 5 safety professionals recognise that this goal of management engagement is one to be worked upon. Essentially, a company's safety record will be improved by engagement organisation wide. Addressing senior management on the value to the company of improving health and safety is a type of advocacy work that all departments have to do. Safety pros are no different in that they will have to continually advocate for their department and its value to the company as a whole. Sadly, it is not enough to just assume senior managers will take workers welfare as seriously as they do! ■

OCCUPATIONAL HEALTH DAY

Indian Association of Occupational Health (IOAH) observes Occupational Health Day every year on July 9th in commemoration of their Foundation Day. IOAH declares a theme every year and organizes several activities closely relating to the scheme.

Theme for this year is **"FROM STATUTORY COMPLIANCE TO SALUTORY PERFORMANCE, CHALLENGES & OPPORTUNITIES".**

The theme is very much fitting and applicable, not just for occupational health, but for entire gambit of Occupational Safety & Health.

We should emphasis the point that Statutory Compliance will be the minimum for survival & the industry has to focus on achieving Salutory Performance which will be more rewarding.

As Safety Professionals, We have to carry forward this message to our respective industry & draw plans for achieving Salutory Performance. ■

ROBOTIC SAFETY

Mr S Kasthuri Babu, Senior Application Engineer, Axis Global Automation, Chennai delivered a Technical talk on **"ROBOTIC SAFETY"** during the Special Technical Meet.

The salient features of his talk is given here for the benefit of members who could not attend this talk.

INTRODUCTION:

The purpose of this instruction is to inform OSHA compliance officers and employers and employees about safety concerns that have arisen with the growing use of robotics systems in manufacturing. Industrial robots can be used to perform hazardous tasks but in doing so they can create new hazards. With the burgeoning use of robots in industry, it is feared that without adequate guarding and personnel training, injury rates for employees working with robots may increase.

Current guidelines for robot safety include the American National Standards Institute (ANSI) ANSI-RIA R15.06-1986, "American National Standard for Industrial Robots and Robot Systems - Safety Requirements," and the National Institute for Occupational Safety and Health (NIOSH) December, 1984 Alert "Request for Assistance in Preventing the Injury of Workers by Robots." Copies of the ANSI Standard are available from the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018. The NIOSH Alert was prepared by its Division of Safety Research, 944 Chestnut Ridge Road, Morgantown, WV 26505.

The ANSI Standard defines consensus provisions for the construction, reconstruction, modification, installation, safeguarding, care, testing, and start-up of robots and robotics systems as well as training for robot and robotics systems operations and maintenance personnel. The NIOSH Alert contains safety recommendations that are based on its field evaluation of the first identified robot-related fatality in the United States.

Robots are reprogrammable, multifunctional, mechanical manipulators that typically employ one or more means of power: electromechanical, hydraulic, or pneumatic. Industrial robots have been used chiefly for spray painting, spot-welding, and transfer and assembly tasks. A robot performs its tasks in a physical area known as the robot operating work envelope. This work envelope is the volume swept by all possible programmable robot movements. This includes the area where work is performed by robot tooling.

A robot can have one or more arms which are interconnected sets of links and powered joints. Arms are comprised of manipulators which support or move wrists and end-effectors. An end-effector is an accessory tool specifically designed for attachment to a robot wrist to enable the robot to perform its intended task. Examples of end-effectors include grippers, spot-weld guns, and spray paint guns. The ANSI R15.O6-1986 Standard defines an industrial robot system as that which includes industrial robots, end-effectors, and any equipment, devices and sensors required for the entire robot system to perform its tasks.

Most robots are set up for an operation by the teach-and-repeat technique. In this technique, a trained operator (programmer) typically uses a portable control device (commonly referred to as a teach pendant) to manually key a robot and its tasks. Program steps are of the up-down, left-right, in-out, and clockwise-counterclockwise variety. Robot speeds during these programming sessions are required to be slow. The ANSI Standard currently recommends that this slow speed should not exceed 10 in/sec (250 mm/sec).

The very nature of robotics systems operations has introduced a new type of employee into the industrial workplace, the corrective maintenance worker. This individual is normally present during all operations of a robotics system and is responsible for assuring continuing operation - adjusting speeds, correcting grips, and freeing jam-ups. The corrective maintenance worker may also be the trained programmer who guides a robot through the teach-and-repeat technique. It is necessary for this individual to be near the robot from time to time, which raises concerns about his or her safety and the safety of other workers who may also be exposed.

(Contd. on next page)

Robotic....

(Contd. from previous page)

This guideline describes some of the elements of good safety practices and techniques used in the section and installation of robots and robot safety systems, control devices, robot programming and employee training. A comprehensive list of safety requirements is provided in the ANSI R15.06-1986 Standard.

TYPICAL ACCIDENTS

The following are documented accidents involving robots that occurred recently in Japan, Sweden, and the United States:

- A worker attempted to remove an imperfectly formed piece from a conveyor with both hands while the operation limit switch of a material feed and removal robot remained in its active position. The worker's back was forced against the robot. - After adjusting a metal shaving machine, an operator was caught between the machine and a just-extended arm of a material feed and removal robot.

A welding robot went functionally awry and its arm flung a worker against another machine. - A worker removed the cover of an operating assembly robot to retrieve a fallen part and caught his hand in the robot's drive train. - A worker attempted to retrieve a part needed in an ongoing assembly without shutting off an assembly robot's power supply. His hand was caught between the robot's arm and the unit being assembled. - A robot's arm functioned erratically during a programming sequence and struck the operator. - A fellow employee accidentally tripped the power switch while a maintenance worker was servicing an assembly robot. The robot's arm struck the maintenance worker's hand. An operator performing trouble-shooting on a metal plater robot maneuvered the robot's arm into a stopped position. This triggered the robot's emergency stop mode which delayed venting of a pneumatic air storage device. When the return mode was activated, the robot's arm moved suddenly and jammed the operator's thumb against a structural member. - An automatic welder robot operator made a manual adjustment without stopping the robot. He was hit in the head by one of the robot's moving parts when the next batch of weldments arrived. - A materials handling robot operator entered a robot's work envelope during operations and was pinned between the back end of the robot and a safety pole.

SAFETY SYSTEMS

The proper selection of an effective robotics safety system must be based on hazard analysis of the operation involving a particular robot. Among the factors to be considered in such an analysis are the task a robot is programmed to perform, the start-up and the programming procedures, environmental conditions and location of the robot, requirements for corrective tasks to sustain normal operations, human errors, and possible robot malfunctions. Sources of robot hazards include:

1. Human errors; 2. Control errors; 3. Unauthorized access; 4. Mechanical hazards; 5. Environmental hazards; and 6. Electric, hydraulic, and pneumatic power sources.

An effective safety system protects operators, engineers, programmers, maintenance personnel, and others who could be exposed to hazards associated with a robot's operation. A combination of methods may be used to develop an effective safety system. Redundancy and backup systems are recommended, particularly if a robot can create serious hazardous conditions.

Guarding Methods:

1. Interlocked Barrier Guard

This is a physical barrier around a robot work envelope incorporating gates equipped with interlocks. These interlocks are designed so that all automatic operations of the robot and associated machinery will stop when any gate is opened. Restarting the operation requires closing the gate and reactivating a control switch located outside of the barrier. A typical practical barrier is an interlocked fence designed so that access through, over, under, or around the fence is not possible when the gate is closed.

2. Fixed Barrier Guard

A fixed barrier guard is a fence that requires tools for removal. Like the interlocked barrier guard, it prevents access through, over, under, or around the fence. It provides sufficient clearance for a worker between the guard and any robot reach, including parts held by an end-effector, to perform a specific task under controlled conditions.

3. Awareness Barrier Device

This is a device such as a low railing or suspended chain that defines a safety perimeter and is intended to prevent inadvertent entry into the work envelope but can be

(Contd. on next page)

Robotic....

(Contd. from previous page)

climbed over, crawled under, or stepped around. Such a device is acceptable only in situations where a hazard analysis indicates that the hazard is minimal and inter locked or fixed barrier guards are not feasible. Interlocked or fixed barrier guards provide a positive protection needed to prevent worker exposure to robotic systems hazards.

4. Presence Sensing Devices

The presence detectors that are most commonly used in robotics safety are pressure mats and light curtains. Floor mats (pressure sensitive mats) and light curtains (similar to arrays of photocells) can be used to detect a person stepping into a hazardous area near a robot. Proximity detectors operating on electrical capacitance, ultrasonics, radio frequency, laser, and television principles are currently undergoing reliability testing in research laboratories because of recognized limitations in their capability of detecting the presence of personnel. Although some of these devices are already available in the safety equipment marketplace, care must be used in their selection to insure adequate safety and reliability. At this time, such proximity detectors are not recommended for such use unless a specific analysis confirms their acceptability for the intended use. Effective presence sensing devices stop all motion of the robot if any part of a worker's body enters the protected zone. Also, they are designed to be fail-safe so that the occurrence of a failure within the device will leave it unaffected or convert it into a mode in which its failed state would not result in an accident. In some cases this means deactivation of the robot. Factors which are considered in the selection of such devices include spatial limitations of the field, environmental conditions affecting the reliability of the field, and sensing field interference due to robot operation.

5. Emergency Robot Braking

Dangerous robot movement is arrested by dynamic braking systems rather than simple power cut-off. Such brakes will counteract the effects of robot arm inertia. Cutting off all power could create hazards such as a sudden dropping of a robot's arm or flinging of a workpiece.

6. Audible and Visible Warning Systems

Audible and visible warning systems are not acceptable safeguarding methods but may be used to enhance the effectiveness of positive safeguards. The purposes of audible and visible signals need to be easily recognizable.

CONTROL DEVICES

The following characteristics are essential for control devices:

1. The main control panel is located outside the robot system work envelope in sight of the robot.
2. Readily accessible emergency stops (palm buttons, pull cords, etc.) are located in all zones where needed. These are clearly situated in easily located positions and the position identifications are a prominent part of personnel training. Emergency stops override all other controls.
3. The portable programming control device contains an emergency stop.
4. Automatic stop capabilities are provided for abnormal robot component speeds and robot traverses beyond the operating envelope.
5. All control devices are clearly marked and labeled as to device purpose. Actuating controls are designed to indicate the robot's operating status.
6. Controls that initiate power or motion are constructed and guarded against accidental operation.
7. Each robot is equipped with a separate circuit breaker that can be locked only in the "off" position.
8. User-prompt displays are used to minimize human errors.
9. The control system for a robot with lengthy start-up time is designed to allow for the isolation of power to components having mechanical motion from the power required to energize the complete robot system.
10. Control systems are selected and designed so that they prevent a robot from automatically restarting upon restoration of power after electrical power failure. The systems also prevent hazardous conditions in case of hydraulic, pneumatic or vacuum loss or change.
11. A robot system is designed so that it could be moved manually on any of its axes

(Contd. on next page)

without using the system drive power.

12. All control systems meet OSHA 29 CFR 1910 Subpart S standards for electrical grounding, wiring, hazardous locations, and related requirements.

INSTALLATION, MAINTENANCE AND PROGRAMMING

Good installation, maintenance, and programming practices include the following:

1. The robot is installed in accordance with the manufacturer's guidelines and applicable codes. Robots are compatible with environmental conditions.
2. Power to the robot conforms to the manufacturer's specifications.
3. The robot is secured to prevent vibration movement and tip over.
4. Installation is such that no additional hazards are created such as pinch points with fixed objects and robot components or energized conductor contact with robot components.
5. Signs and markings indicating the zones of movement of the robot are displayed prominently on the robot itself and, if possible, on floors and walls.
6. Stops are placed on the robot system's axes to limit its motions under rated load and maximum speed conditions.
7. A lock-out procedure is established and enforced for preventive maintenance or repair operations.
8. The robot manufacturer's preventive maintenance schedule is followed rigorously.
9. A periodic check of all safety-critical equipment and connections is established.
10. Stored energy devices, such as springs and accumulators, are neutralized before robot servicing.
11. Only programmers have access to the work envelope and full control of the robot when it is in the teach mode.
12. All robot motion initiated from a teach pendant used by a programmer located within the robot work envelope is subject to the current ANSI slow speed recommendation of 10 in/sec (250 mm/sec).

TRAINING

Effective accident prevention programs include training. Some points to be considered in training programs include:

1. Managers and supervisors in facilities that use robots are trained in the working aspects of robots so that they can set and enforce a robotics safety policy from an informed viewpoint.
2. The employer insures that his or her company has a written robotics safety policy that has been explained to all personnel who will be working with robots. This safety policy states by name which personnel are authorized to work with robots.
3. Robot programming and maintenance operations are prohibited for persons other than those who have received adequate training in hazard recognition and the control of robots.
4. Robot operators receive adequate training in hazard recognition and the control of robots and in the proper operating procedure of the robot and associated equipment.
5. Training is commensurate with a trainee's needs and includes the safeguarding method(s) and the required safe work practices necessary for safe performance of the trainee's assigned job.
6. If it is necessary for an authorized person to be within the work envelope while a robot is energized, for example during a programming sequence, training is provided in the use of slow robot operation speeds and hazardous location avoidance until the work is completed. Such training also includes a review of emergency stops, and a familiarization with the robot system's potentially hazardous energy sources. ■

CHEMICAL PNEUMONITIS

Chemical pneumonitis is inflammation of the lungs or breathing difficulty due to inhaling chemical fumes or breathing in and choking on certain chemicals.

Causes

Many household and industrial chemicals can produce both an acute and a chronic form of inflammation in the lungs.

Some of the most common dangerous, inhaled substances include:

- Chlorine gas (which are breathed in from cleaning materials such as chlorine bleach, during industrial accidents, or near swimming pools)
- Grain and fertilizer dust
- Noxious fumes from pesticides
- Smoke (from house fires and wildfires)

Chronic chemical pneumonitis can occur after only low levels of exposure to the irritant over a long time. This causes inflammation and may lead to stiffness of the lungs. As a result, the lungs start to lose their ability to get oxygen to the body. Untreated, this condition can cause respiratory failure and death.

Chronic aspiration of acid from the stomach and exposure to chemical warfare can also lead to chemical pneumonitis.

Symptoms

Acute:

- Air hunger (feeling that you cannot get enough air)
- Breathing that sounds wet or gurgling (abnormal lung sounds)
- Cough
- Difficulty breathing
- Unusual sensation (possibly burning feeling) in the chest

Chronic:

- Cough (may or may not occur)
- Progressive disability (related to shortness of breath)
- Rapid breathing (tachypnea)
- Shortness of breath with only mild exercise

Exams and Tests

The following tests help determine how severely the lungs are affected:

- Blood gas
- CT scan of chest
- Lung function studies
- X-ray of the chest
- Swallowing studies

Treatment

Treatment is focused on reversing the cause of inflammation and reducing symptoms. Corticosteroids may be given to reduce inflammation, especially before long-term scarring occurs.

Antibiotics are usually not helpful or needed. Oxygen therapy may be helpful.

In cases of swallowing and stomach problems, eating small meals in the upright position can help. In severe cases, a feeding tube in the stomach is needed.

Outlook (Prognosis)

The outcome depends on the chemical, the severity of exposure, and whether the problem is acute or chronic.

Possible Complications

Respiratory failure and death can occur.

When to Contact a Medical Professional

Call your doctor if you have trouble breathing after inhaling (or possibly inhaling) any substance.

Prevention

Only use household chemicals as directed, and always in well-ventilated areas. Never mix ammonia and bleach.

Follow work rules regarding breathing masks and wear the right mask. People who work near fire should take care to limit their exposure to smoke or gases.

Be careful about giving mineral oil to anyone who might choke on it (children or the elderly).

Do not siphon gas or kerosene. ■

CASE STUDY

SLIP AND FALL - FATAL

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.

WHAT HAPPENED

A woman worker was working in a bread cooling section of the factory. Freezer and steel storage racks were housed in one corner of this section.The floor was paved with good tiles for easy maintenance. During the course of the work, the woman worker inadvertently had a slip, lost balance and as result, hit on the steel rack, sustained head injury and fell on the floor in an unconsciousness condition. She was taken to the hospital and declared dead.

CAUSE FOR THE ACCIDENT

It seems there was poor lighting in this section, moreover the flooring was slippery. The worker was also was also wearing a worn out chappal and these have resulted in imbalance causing the slip and hence this accident.

Recommendations to avoid reoccurrence:

Non-slip Walking Surface

- Determine the floor slip resistance at each work location and implement measures to reduce its slipperiness
  - by using non-slip tiles
  - by applying a slip resistant coating on the existing walking surface;
  - by strategic placement of anti-slip mats and anti-slip tape/ stickers|

2. Non-slip Footwear

- Provide workers with appropriate non-slip footwear (e.g. safety boots or walking shoes with adequate slim resistance) for the location of work. The footwear slip resistance should be one that is appropriate for the environment that the workers are exposed to work.

3. Good Housekeeping

- Carry out regular floor inspection and maintenance to ensure that floors are in good condition and remain safe for work.
- Specify in the safe work procedure that floors are to be kept dry and free from contaminants (e.g., oil, wood dust) at all times and that any spills should be cleaned up immediately.

4. Hazard Awareness

- Train workers to identify slip hazards at their respective workplaces and on the various anti-slip control measures.
- Provide suitable signage to indicate wet floor or that cleaning is in progress. This will raise the awareness of the on-site slipping hazard so as to get people to be extra careful or to walk around the affected area to avoid the hazard.
- Barricade floor areas that are unsafe (e.g. missing, broken or loose floor tiles) and install suitable warning signs until the area has been made safe.
- Ensure work areas are sufficiently illuminated so that workers would be able to see the warning signs and/ or spot any slipping hazard along their path of movement.

5. Workers' Health

- Ensure that workers have sufficient rest.

Long hours (including overtime work) and strenuous activity can cause fatigue (a state of tiredness) which will reduce one's alertness to hazards (including slipping hazards. in the work environment.

- To prevent falls, workers on medication that can cause drowsiness should be given light duties or be limited to work of a sedentary nature.

6. Safe Behaviour

- Discourage reading and hand phone usage while walking. Advise workers to always pay attention when walking and look out for potential dangers.

Risk Assessment

Conduct a thorough Risk Assessment for all work activities to manage any foreseeable risk that may arise during the course of work. The Risk Assessment should look into the following areas

1. *Possibility of floor becoming slippery in the course of work*

- Floors may become oily (e.g. due to cooking activities in industrial kitchens or maintenance activities in vehicle workshops) or wet (e.g. due to condensation outside cold rooms or inadequate cleaning procedure) as works progress. Include in the safe work procedure the need for regular floor inspection and the requirement to dry and degrease the floor as often as reasonably practicable. The use of non-slip tiles and the placement of anti-slip mats and anti-slip tape/ stickers are particularly important in such work areas.

2. *Possibility of one's footwear becoming worn out over time*

- Implement a footwear inspection programme where footwear is checked regularly (e.g. every 4 to 6 months) for wear and tear, and replaced as necessary. ■

WHAT IS NITROGEN OXIDE POLLUTION?

NOx pollution occurs when nitrogen oxides are released as a gas into the atmosphere during high-temperature combustion of fossil fuels. Nitrogen oxides consist mainly of two molecules, nitric oxide (NO) and nitrogen dioxide (NO_2). Other nitrogen based molecules are also considered NOx, but occur in much lower concentrations. A closely related molecule, nitrous oxide (N_2O), is a significant greenhouse gasplaying a role in global climate change.

What Are the Environmental Concerns Associated with NOx?

NOx gases play an important role in the formation of smog, producing the brown haze often observed over cities, particularly during the summer. When exposed to the UV rays in sunlight, NOx molecules break apart and form ozone (O3). The problem is made worse by the presence in the atmosphere of volatile organic compounds (VOC), which also interact with NOx to form dangerous molecules. Ozone at the ground level is a serious pollutant, unlike the protective ozone layer much higher up in the stratosphere.

Nitrogen oxides, nitric acid, and ozone can all readily enter the lungs, where they create serious damage to the delicate lung tissue. Even short-term exposure can irritate the lungs of healthy people. For those with medical conditions like asthma, a short time spent breathing these pollutants has been shown to increase the risks of an emergency room visit or a hospital stay. Approximately 16% of houses and apartments in the United States are within 300 feet of a major road, increasing exposure to hazardous NOx and their derivatives.

For these residents, and in particular the very young and elderly, this air pollution can lead to respiratory diseases such as emphysema and bronchitis. NOx pollution can also worsen asthma and heart disease, and is tied to elevated risks of premature death.

More environmental problems are caused by NOx pollution. In the presence of rain, nitrogen oxides form nitric acid, contributing to the acid rain problem. Additionally, NOx deposition in the oceans provides phytoplankton with nutrients, worsening the problem of red tides and other harmful algae blooms.

Where Does NOx Pollution Come From?

Nitrogen oxides form when oxygen and nitrogen from the air interact during a high temperature combustion event. These conditions occur in car engines and fossil fuel-powered electricity plants.

Diesel engines, in particular, produce large amounts of nitrogen oxides. This is due to the combustion features characteristic of this type of engine, including their high operating pressures and temperatures compared to gasoline engines. In addition, diesel engines allow excess oxygen to exit the cylinders, diminishing the effectiveness of catalytic converters, which in gasoline engines prevent the release of most NOx gases. ■

MUMBAI CHAPTER: PROFESSIONAL DEVELOPMENT PROGRAMME

Safety Engineers Association-Mumbai Chapter conducted professional development programme on **"Fire Safety in High Rise Buildings"** on Saturday, 11th July 2015.

Mr Arvind Mandke, Chief Fire Officer - Thane Fire Brigade delivered the technical talk on this topic. He elaborated several key safety issues concerning high rise buildings, challenges in managing serious emergencies, analysis of some of the major fires and his experience in handling them. He also discussed the regulations to be followed by the residents of high rise buildings. There were lot of interaction by the participants, they raised several issues which they come across.

Dr Pant, President, SEA India, Mumbai Chapter highlighted the need to have more such professional development programmes in future as there is lot of benefit through this technical knowledge sharing and encouraged members to refer more professionals to join this association.

Mr M Murali, Secretary, SEA India - Mumbai Chapter briefed the various services rendered by this association. The programme came to an end with vote of thanks. *(Photo on page 15)* ■

IN THE NEWS

G7 nations pledge to drive down 'unsafe working conditions'

The world's seven leading industrial nations have pledged to use their muscle to drive down unsafe and poor working conditions in the world's supply chains.

In a declaration released on the final day of talks at their summit in Germany on 7 and 8 June, the G7 leaders said they would seek to promote "labour rights, decent working conditions and environmental protection" as key players in global supply chains.

They also committed to support a "Vision Zero Fund", to be established in cooperation with the International Labour Organisation (ILO), to help prevent and reduce work-related deaths and serious injuries by "strengthening public frameworks and establishing sustainable business practices".

The declaration read: "Unsafe and poor working conditions lead to significant social and economic losses and are linked to environmental damage. Given our prominent share in the globalisation process, G7 countries have an important role to play in promoting labour rights, decent working conditions and environmental protection in global supply chains.

We will strive for better application of internationally recognised labour, social and environmental standards, principles and commitments (in particular UN, OECD, ILO and applicable environmental agreements) in global supply chains."

World Heart Day 2015: Heart Disease in India is a Growing Concern – Ansari

To raise awareness for World Heart Day, Vice President Hamid Ansari strongly favoured the need to develop a comprehensive approach to combat heart disease in India which is on its way to becoming an epidemic in the country. Latest statistics suggest that in India, there are roughly 30 million heart patients and two lakh surgeries are being performed every year.

World Heart Day is celebrated every year on 29th September with the intent of raising awareness about cardiovascular disease. Every year has a different theme which tackles different aspects of heart disease. This year, the theme on World Heart Day is creating heart-healthy environments.

While inaugurating this year's World Heart Day event, Mr. Ansari said, "We would need a comprehensive approach to combat heart disease, with a focus on education and access to proper health facilities. For this, both the public and the private sectors have to work together."

Currently, the key challenges that face cardiac care in India are inadequate facilities, accessibility, the price tag attached to efficient and effective treatment, lack of awareness of non-communicable diseases, he said. Apparently, demographic projections suggest a major increase in cardiovascular disease mortality as life expectancy increases and the age structure of the growing population changes.

Of the 30 million heart patients in India, 14 million reside in urban areas and 16 million in rural areas. He said, "If the current trend continues, by the year 2020, the burden of atherothrombotic cardiovascular diseases in India will surpass that of any other country in the world.

The growth of heart diseases is dependent on a number of interlinked factors such as ageing, changing lifestyles, bad eating habits and rapidly evolving socio-economic determinants like access to healthcare. growth of heart diseases affects not just the urban and economically well-off but also the under-privileged.

The Indian rural population and urban poor especially are facing a "double burden" - with incidences of acute diseases continuing, while there is a rapid growth in incidences of chronic diseases, "Today, cardiac hospitals in India perform over 2,00,000 open heartsurgeries per year, one of the highest, worldwide. There has been a steady annual rise to the tune of 25-30 per cent per year in the number of coronary interventions over the past several years" he added.

Heart disease is now the world's leading causes of death, claiming 17.3 million lives each year, he said, adding, India has seen a rapid transition in its heart disease burden over the past couple of decades.

However, it's been projected that the load of communicable and non-communicable diseases might get reversed by 2020. Listing out some of the government initiatives to combat the heart disease, he said the Parliament in 2003 had also passed the Cigarettes and other Tobacco Products Act to further the cause of prevention of cardiovascular diseases.

SAFETY PROFESSIONALS MEET

L-R: Thiru S Ulaganathan, Thiru D Vasudevan, Thiru Gnanasekara Babu Rao, Dr R K Elangovan and Thiru M Ravichandran

SEA (India), in collaboration with Directorate of Industrial Safety & Health, Government of Tamilnadu and Regional Labour Institute, Chennai, Govt of India conducted a special programme on **"Safety Professionals Meet & Interaction with Regulatory Authorities"** on Friday, July 3rd 2015 at Regional Labour Institute Auditorium, Chennai.

Dr R K Elangovan, Director in charge, DGFASLI, Chennai, Govt of India welcomed the participants.

Thiru G Gnanasekara Babu Rao, Director, Industrial Safety & Hygiene, Govt of Tamilnadu inaugurated the meet and delivered the presidential address.

Thiru D Vasudevan, Chief Inspector of Factories (Retd.), delivered keynote address.

Thiru S Ulaganathan, President, SEA (India) delivered the vote of thanks.

Presentations on "Factories Act & case Laws, B O C W Act & Case Laws, DGFASLI in making OSH Regulations, Standards & Codes for Industrial Safety, New Safety Equipments-Introduction" were delivered by experts in the field.

Interaction by participants with Statutory Regulatory Authorities was held in the afternoon. Large number of safety professionals from all over India participated in the meet.

Thiru Kumar Jayanth IAS, Secretary, Labour & Employment, Govt of Tamilnadu delivered the valedictory address and distributed the certificates to the participants.

SEA India thank the Director, Directorate of Industrial Safety & Hygiene,Dirctor-in Charge, Regional Labour Institute, DGFASLI, Chennai and others for their encouragement and success of this meet.

14TH ANNIVERSARY OF SEA (INDIA)

L-R: Dr S Sivanesan, Thiru S Ulaganathan, Thiru Gnanasekara Babu Rao, Thiru S Muthupalaniappan, and Thiru R Sriram

Fourteenth Anniversary Function was held on July 4th 2015 at J P Hotel, Koyambedu, Chennai. Mr S Ulaganathan, President, SEA India welcomed the gathering. Dr Sivanesan, Dean, A C College of Technology, Guindy delivered special address.

Mr Muthu Palaniappan, Vice President, Brakes India (P) Ltd, Unit-2, Sholingur gave a talk on "Case Studies & Best Practices in Industries".

Mr C Gnanasekara Babu Rao, Director, DISH, Government of Tamilnadu delivered the keynote address.

Mr R Sriram, Secretay, SEA India gave vote of thanks.

The anniversary function came to an end with special technical talks on "Robotic Safety" and "Challenges faced by Safety Professionals".

The Fourteenth Annual General Body Meeting was held in the afternoon after lunch.

MUMBAI CHAPTER: PROFESSIONAL DEVELOPMENT PROGRAMME

SEA (INDIA)

A Profile on

SAFETY ENGINEERS ASSOCIATION

(Registered under Societies Act 1975)

(URL: www.seaindia.org)

Safety Engineers Association (SEA - INDIA) was started in the year 2000. It is a registered body under the Societies Act 1975. The association has now grown up to have more than 600 members from different parts of the country. Safety Engineers and Practicing safety Professionals along with other associated safety personnel such as those involved in safety education, safety law enforcement, safety consultancy and other safety services have become members of SEA India, under different category of membership. Students of safety engineering courses are enrolled as Student Members.

Key Objectives

- To Serve as a vital link for safety engineers at national level to network among themselves.
- To share their knowledge and experience.
- To interact with Government bodies and other professional organisations.
- To get due recognition of the safety professional by improving their image in the society.
- To provide advice/guidance/help to industries, Government and Academic Institutions.
- To coordinate with statutory bodies in formulating safety and related legislations.

Activities

Safety Engineers Association offers the following services to its members and carry out necessary activities as given below:

- Membership certificates are issued to corporate grade life members.
- Directory of the members of the association are issued and updated periodically, in order to help the members to interact among themselves.
- Quarterly journals are published and are provided free of cost to all members to disseminate articles, case studies, news updates etc. on occupational safety & health.
- Professional Chapters and Student Chapters of SEA are formed to promote regional activities of the association.
- Maintain an exclusive website, **www.seaindia.org** and provide updated information on the activities of the association.
- Members are taken on a safety tour to visit leading factories to share their best practices in safety management.
- Professional Development Programmes are organised once every quarter by inviting experts in the field of safety to deliver on topics of special interest.
- Case studies on typical / serious / fatal accidents along with a review on their causes and remedial measures are shared with the Members by issuing monthly Safety Alerts.
- Meetings, conferences, workshops and training programmes are arranged to provide opportunity for the members to participate and enhance their knowledge and interact with specialists and other participants.
- Professional courses and Training programmes are taken up to impart safety education and skills to safety engineers and others concerned on request.

Membership

Application Form and other details may be obtained from SEA Office.

Safety Engineers Association (India)

G1, V V Palace, Vinodh Foundations, Old No:95/5, New No:245/5,
Sundaramurthy Gramani Street, Virugambakkam, Chennai -600092
Tel: 44-23774060 Mob: 9965204060 E Mail: info@seaindia.org