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Eleventh Anniversary of SEA (India)

The Eleventh Anniversary of SEA India was celebrated on Sunday, May 27th 2012 at Hotel Benzz Park, T Nagar, Chennai.

The special address was given by Dr P S S Srinivasan, Principal, Knowledge Institute of Technology, Salem. Mr S Visvesvaran, General Manager, Operations, Chennai Petroleum Corporation Ltd, Chennai gave the Keynote address. Mr K Rajaraman, IAS, Managing Director, Chennai Metro Rails was the Chief Guest on that occasion. Technical talks on "Safety in Tunnelling Operations, Chennai & International Perspectives" by Mr Martyn Gomersall, Chief Safety Expert, EMBYE - General Consultant, Chennai Metro Rail Project, Chennai and "Disaster Management - Trends in India" by Dr K M Parivelan, Director, Earth Smiles, Chennai were delivered.

A Certificate of Merit and Shield was announced to Mr. Baskaran Chandra Sekaran who scored the highest mark in the September 2011 batch of the International General Certificate Course of NEBOSH conducted by the SEA (India).

Large number of SEA members attended the function.

Sitting L-R: Mr. P. Manoharan, Mr. S. Visvesvaran, Mr. K. Rajaraman, I.A.S., Dr. P.S.S. Srinivasan and Mr. S. Ulaganathan


SEA (India) President, Mr. S. Ulaganathan addressing the members

Inside....

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FROM THE DESK OF PRESIDENT

Dear Members,

I am pleased to remind all the members that SEA (India) is now 11 Years old. 11th Anniversary function was held on 27th May 2012 at Chennai, when it was a nice opportunity for the members to meet each other. Participants had an interesting day out in listening to many safety presentations including one on the upcoming Chennai Metro rail Project. Members stayed over and attended the Annual General Body Meeting on the same day. I am sure, by now you would have known the new set of Executives elected for the next term of two years. I personally thank the members for giving me one more term in serving the members.

New Executive Committee did not wait for long and convened their first meeting on 9th June 2012 and chalked down their course of actions in the days to come. Earlier, there was a Factory Visit to M/s Caterpillar India, Thiruvallur on 28-4-2012. "Indian safety Engineer" for the first quarter 2012 was released in April 2012 and hopefully the next issue will reach you soon.

Mumbai Chapter of SEA (India) had their quarterly technical meet and factory visit at Tata Power Company, Trombay on 12th May 2012. We are not hearing much from the Vadodara Chapter after their first meeting in Jan 2012. But, hearing some whispers from New Delhi (Gurgaon) on the formation of a new SEA (India) Chapter there. Let's wish them good luck.

We are planning to conduct the eleventh batch of Nebosh IGC course by SEA India during October 2012. Wait for the final announcement of dates for enrolling yourselves or your colleagues.

SEA (India) website, www.seaindia.org is now fully functional, but periodical updates into the site are pending, as there is a change in the web administrator. Members may advise their Service providers / vendors to contact SEA India office for advertising their products / services in the exclusive web page available in our website.

Many useful safety reference books / standards are getting added to the Library maintained at SEA office and members are advised to visit the library in their free time and make full use of it. For your convenience, the SEA Office is open on weekends including Sundays between 09.00 a.m. and 05.00 p.m. as it is closed only on Tuesdays.

Seasons Greetings & Best Wishes!

S. Ulaganathan
President, SEA (India)

MINUTES OF THE ANNUAL GENERAL MEETING

The Annual General Body meeting was held on May 27th 2012 after the Eleventh Anniversary Function.

Mr.S.Ulaganathan, President, presided over the meeting. He highlighted the activities of the association and requested the members to give suggestions to improve the activities.

After discussing the annual report for the year 2011-2012, Bye Law was amended as follows.

THE EXECUTIVE COMMITTEE:

I. The executive committee shall comprise of Fifteen Corporate Grade members. It will be constituted with President, Vice president, Treasurer, Secretary, Joint Secretary and Ten committee members

II. One professional representative from National Safety Council (India) or any such safety promotional forum will be added to the committee on nomination basis.

III. Patrons (Limited to Three at any time) as approved by the General body and Honorary Member will be attending Executive Committee meetings as invitees and offer suggestions and guidance as required.

IV. Executive committee can invite any member or otherwise to participate in the meetings as required.

V. Executive committee can nominate eminent safety professionals (who are capable of being mentors), as "Advisors" who will provide guidance and strength to the association. Such Advisors will be limited to three in number and their term will end along with that of the Executive committee appointing them. They can be invited to participate in the executive committee meetings or be given some special assignments depending upon the requirements

VI. The term of office of the Executive committee shall be two years and thereafter the committee will be elected by the General Body of the association.

VII. Members desirous of contesting the election for the Executive Committee but not able to participate in the Annual General Body meeting may submit their willingness in a prescribed proposal form duly filled in and submit to the Secretary before the due date.

VIII. Serving members in the committee may also stand for re- election. The election will be conducted according to the normal procedure adopted and approved by the Executive committee.

IX. The meeting of the executive committee shall be held **at least** once in a quarter and all the members should attend the meeting without fail. Seven days notice will be given with agenda to each members of the executive committee.

X. President of the outgoing committee will participate in the newly elected Executive committee as honorary member till the term of the committee.

Election: AGM nominated Mr.W.A.Balakumaran (Patron) as the election officer and he conducted the election proceedings for electing the members and office bearers for the period 2012-2014.

The following are declared elected:

President	-	S. Ulaganathan
Vice President	-	P.P. Janaradhanam
Secretary	-	N. Kumar
Joint Secretary	-	R. Parameswaran
Treasurer	-	M. Ravichandran
Members	-	R. Kumar
		G.M.E.K. Raj
		P. Subramani
		R.V. Sudhakar
		L. Sukumar
		P. Manoharan
		G.S. Swaminathan
		P. Rajmohan
		G. Varadharajan
		K.G. Varadharajan

It was also agreed to request National Safety Council, Tamilnadu Chapter to nominate one of their representatives to join SEA Executive committee as per Bye Law.

Ceremonial reception was given to the Incoming Executive Committee and the new committee took charge.

Mr. S. Ulaganathan, President thanked the outgoing committee and extended warm welcome to the new committee taking office. He had also thanked GB for electing the new set of members unanimously and for their continuous support extended to the executive committee. He assured members that the new committee would strive their best to achieve better results in extending professional services to members.

The General Body Meeting ended with vote of thanks by Mr. M. Ravichndran, Treasurer.

SAFETY IN TUNNELLING OPERATIONS

During the Eleventh Anniversary Function of SEA India, Mr. Martyn Gomersall, Chief Safety Expert, EMBYE (CMRL Project) delivered a special Technical talk on **"Safety in Tunnelling Operations"**. The contents of his talk is given in this article.

Introduction

There can be no doubt that tunnel construction is, on the face of it, extremely dangerous. These dangers have been recognised for many years and initiatives have been taken to improve the safety of workers and affected parties which has culminated in the modern Tunnel Boring Machine (TBM) used in almost all tunnels in today's construction world. Yet in spite of the modern equipment and technology, many hazards and risks remain and the role of the tunneling safety engineer is crucial in delivering safe tunneling projects.

The early years and development of the TBM

One of the earliest tunnelling shields was designed and used in the construction of the Thames Tunnel by Marc Brunel (the father of the more famous Isambard Kingdom Brunel. The tunneling shield gave protection to the workers digging the tunnel from collapse of the working face but it still took brute human strength to dig and didn't prevent the numerous occasions of water inundation.

Later in the history of tunneling, the "Greathead Shield" was developed which, though still using human power to dig, it did give much better protection to the workers as cast iron tunnel linings were installed immediately behind the working face and thus gave better protection to the workers from ingress of water and collapse of the tunnel. The Greathead Shield was used extensively on the development of the London Underground network in the late 1800s and early 1900s.

Moving forward a few decades saw the development of the modern TBM which provided not only excellent protection for the workers but also had replaced human labour with mechanical means of digging.

The Modern TBM

Today's tunnels are almost exclusively constructed using TBMs, which come in three main variants, a description of which is beyond the scope of this paper. Essentially the TBM is a shield and temporary support for the ground being tunnelled and provides protection from the ingress of water through the application of pressure to the working face at a pressure equal to the force exerted by the groundwater in the area. The TBM is able to tunnel through almost any ground conditions from sand and clay through to different types of rock.

The tunnel immediately behind the TBM is fitted with pre-cast concrete tunnel liners which are then grouted into place to give a rigid structure and protecting the tunnel from ground water and collapse.

The modern TBM is not without its hazards however and risks abound in and around the working environment. The following table lists just a few of the hazards to be found in the tunnelling environment and though some may be familiar to you from your own work place, they take on a different aspect when you consider that the workers are in a tunnel with only one exit!

- Electricity Hydraulic Pressure
- Confined Spaces Ground Pressure
- Lifting Heavy Equipment Rotating Machinery
- Moving Equipment (Locomotives)Grout (Pressure & Chemical Hazards)
- Hot Works Falls From Height
- Slip / Trips / Falls (STFs)Gases (Flammable / Noxious)
- Poor Lighting Oxygen (Depletion / Enrichment)
- Long Hours Geo-Technical Aspects
- Hyperbaric Working (working at pressure)

To overcome these hazards and protect people from risk requires a lot of planning by experienced people.

Mitigating the Risks

The above hazard table represent just a few of the hazards found in the tunnelling environment and the risks emanating from those hazards include death and injury of workers, but there is also a risk to the public unless strict mitigating measures are taken (I will cover this risk later in the paper).

It is extremely important that Risk Assessments are conducted for the hazards which can arise from tunneling construction operations and the risks must be assessed from the point of view of the work environment. TBM work sites are often hot and humid places, where

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Safety ....

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people are working long hours under the stress of the environment and production pressures. It requires competent and well experienced engineers and safety engineers to produce the mitigating measures required to ensure a safe and healthy work site.

For the tunneling professionals there is a Code of Practice for Safety in Tunneling in the form of BS 6164: 2011. The CoP covers the typical hazards and risks in tunneling and provides a vast resource of advice and recommendations based on years of experience. BS6164 is the leading source of guidance in tunneling safety around the world and there is hardly a project which does not specify it in its contract terms and conditions.

The Risk to Public

Urban tunneling has the added hazards of potentially disturbing the ground in the path of the tunnel construction leading to the collapse of roads and buildings which have the potential for the catastrophic loss of life. Fortunately Geo-Tech surveys and design and technology have stepped in to robust provide solutions to the potential hazards and risks of undermining.

All tunneling construction sites and especially in an urban context will plan ahead of the project and understand the geological conditions in the path of the tunnel and consider which buildings are potentially at risk. In all cases sensitive monitoring equipment is installed to immediately identify any ground vibrations or movement of buildings, the latter often by means of automated surveying equipment. Where any movement of buildings is predicted or indicated, there are various non-intrusive techniques for supporting buildings and protecting them from the effects of vibration. These measures may include the injection of cement into the areas underneath and around a vulnerable building which reinforces its foundations. This is particularly important in the areas around historic buildings whose foundations may have weakened over time.

It is important to note that the safety of roads and buildings is a high on the list of hazards considered during the planning phase of a tunnel construction project and tunnel construction companies go to great lengths to ensure the stability of ground along the alignment of a newly constructed tunnel.

Tunneling in Chennai

The CMRL Project will involve the construction of around 24km of tunnels in the urban area of Chennai. This is, to my knowledge, the first large scale tunneling project in Chennai and has resulted in the importation of both technology and knowledgeable, experienced people into Tamil Nadu and Chennai in particular.

The Chennai tunneling environment is a mixture of sands, clay and weathered rock and the TBMs which have been imported into Chennai to complete this work are designed and proven to safely cope with these geological conditions. Likewise the engineers and specialist technicians coming into Chennai to complete the work have vast experience in other tunneling projects around the world including India.

A drive around Chennai's busy roads will inevitably bring you into near proximity to the TBM launching sites with the sight of large cranes towering above the barricades which are set up to separate the public from these hazardous work sites. What you may not be able to see is the measures being put into place to protect workers and the public from harm and the measures to protect buildings and roads from any adverse effects of the tunnelling operations. These measures are comparable to any in other parts of the world and are indeed truly world-class.

Conclusion

Tunnel construction has come a long way since those early tunneling shields to the modern TBMs of today's construction sites, but safety is still a concern. Numbers of people injured in the tunneling construction industry are still unacceptably high.

A complete picture of all the aspects of safety in tunneling construction is not possible in the space allocated to me in this publication; needless to say though that the engineers and projects managers pay close attention to safety. From the beginning of the project to the final handover of a complete tunnel, safety is a driving factor.

In India the recruitment of local engineers and safety engineers with tunneling experience has been a challenge to consultants and contractors alike and there is a need to nurture more local tunneling experienced safety engineers as more and more metro systems are conceived in India; with the resulting need to tunnel below the urban areas of our cities. There needs to be a push for engineering institutes to recognise the future needs of tunneling in India and develop programmes designed to plug the gap in tunnel safety knowledge in India. ■

VALIDATING SUB-SEA GAS PIPELINE LEAKS DISCHARGE MODEL FOR ARABIAN SEA CONDITIONS

Ph.D. research article by **Mr. P.C. Sridher,** SEA India Member

1. Introduction

A number of Gas leaks from subsea pipelines have been recorded in recent years. These occurrences highlight the need for better understanding of the way Gas leaks (plume) behave under water and the risks they present. This requirement was underlined by the submarine gas blowout on the Snorre, an offshore installation of Norway in 2004 and other similar incidents reported world-wide this decade.

The effects of subsea hydrocarbon release depend on a number of factors, including whether the release is liquid or gas. For a liquid release, the buoyancy will result in the leaked material spreading on the surface to form either a polluting slick, or an expanding pool fire. For a gas release, although the buoyancy is rather greater, significant drag forces will cause the plume to break up and rise to the surface as a series of bubbles. On breaking surface, ignition of the gas plume would result in a sea surface fire with different characteristics to those incorporated into the usual pool and jet fire models. Alternatively, and more likely, the plume will begin to disperse in the atmosphere, and may be diluted to a concentration below the lower flammable limit before there is any possibility of encountering an ignition source. A further effect of a gas bubble plume is the reduction in the stability of floating vessels, due to either the loss of buoyancy, or, more likely, due to the radial outflow of water which has been entrained into the plume.

Consequence models are used to predict the physical behaviour of hazardous incidents mainly flammable & toxic releases. Some models only calculate the effect of a limited number of physical processes, like discharge or radiation effects. More complex models interlink the various steps in consequence modelling into one package. The field of consequence modelling for hydrocarbon releases in open atmospheric conditions is highly developed.

The development of dispersion models for atmospheric leaks has emerged through three major stages over a period of time:

Stage 1: Development/establishing the methodology (Calculation basis);

Stage 2: Validation of results by experimentation and case histories;

Stage 3: Refining of methodology/ model based on the feedback from experimentation and case histories.

Whereas, the understanding about the behaviour of a subsea gas release up through the water column (plume raise) is very limited from risk assessment point of view. The hydrodynamic basis for bubble-plume flows is reasonably well understood, but the solutions of the associated equations, depend on a large number of parameters that can only be evaluated by experimentation.

In the recent years some research works are done in UK and Norway to study the sub-sea gas leaks plume behaviour for North Sea conditions. However no such research work is carried out in India for Arabian Sea Conditions. Hence, this thesis is aimed at VALIDATING SUB-SEA GAS PIPELINE LEAKS DISCHARGE MODEL FOR ARABIAN SEA CONDITIONS.

2. Objectives:

a. To identify various sub-sea gas discharge models that are currently being used in North Sea with respect to plume discharge (initial release of plume to the sea surface from the point of leak);

b. To study & analyse the accuracy and uncertainty levels of various discharge models used in North Sea based on the feedback received from lab scale experimentation and limited filed trials carried out so far;

c. Identify and suggest the most optimal discharge model suitable for Arabian Sea conditions striking a right balance between a) accuracy, b) uncertainty, c) cost-effectiveness and d) user-friendliness;

d. Validate the chosen model for Arabian Sea Conditions based on lab-scale experimentation.

3. Contribution of this research

The outcome of this research will greatly benefit the Indian oil and gas industry for enhancing the accuracy of Risk Assessment (Consequence modelling part) of their sub-sea gas pipelines leaks so as to implement specific safety measures to protect the precious national assets.

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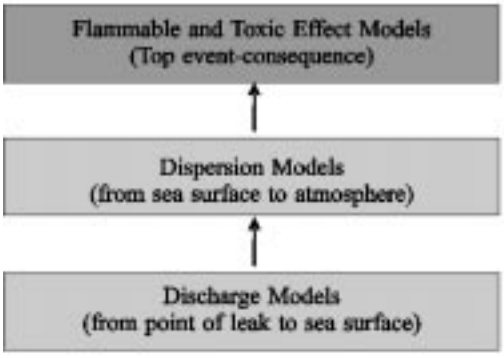
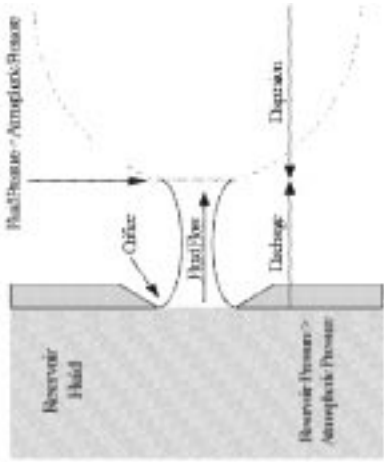
4. Overview of research model





5. Overview of research approach

INPUT
(Literature survey)
Identify & Study various discharge models that are currently being used in North Sea with respect to plume discharge (initial release of plume from the point of leak to the sea surface) from Consequence point of view.

→

PROCESS
(Subject of research)
Identify the discharge (plume raise) model most suitable for Arabian Sea conditions.

→

OUTPUT
(Validate the results through Experimentation)
Validate the established model for Arabian Sea conditions by lab-scale experimentation.

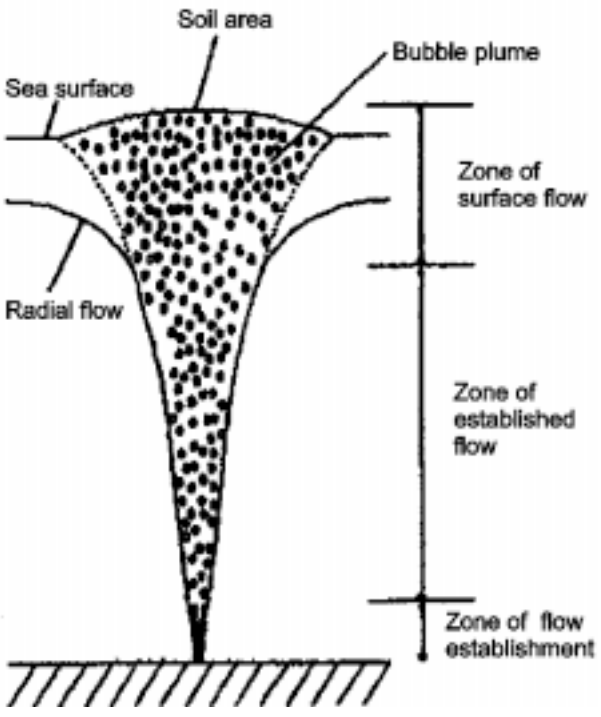
6. Gas discharge Plume behaviour

The discharge of the gas from the release point to the surface is considered in three zones

Zone of Flow Establishment (ZOFE): The region between the release point and the height at which the dispersion appears to adopt a plume-like structure. At this height the effects of initial release momentum are considered to be secondary to the momentum induced by buoyancy.

Zone of Established Flow (ZOEF): The plume-like region of dispersion which extends from the ZOFE to a depth beneath the free surface which is of the order of one plume diameter.

Zone of Surface Flow (ZOSF): The region above the ZOEF where the plume interacts with the surface causing widening of the bubble plume and radial flow of water at the surface.



7. Gas discharge models used in North Sea

Three approaches, of varying complexity, have been used in modelling the discharge of subsea releases in North Sea:

a. Empirical/ Cone model
b. Integral Model
c. Computational Fluid Dynamic (CFD) model

The simplest are *empirical models* which consist of those that assume the plume radius to be proportional to the release depth or correlations that have been produced to fit the available experimental data.

Integral models are based on local similarity i.e. the radial profiles of velocity and density defect are assumed to have a similar form at different heights within the plume. The plume properties can be represented, using for example *Gaussian profiles*, by their plume centreline values. Entrainment of water into the plume is described using a correlation relating the rate of increase of water flow to the plume centreline properties through the use of an entrainment coefficient, as is used in single phase plume modelling. Gas continuity, and equating the increase in momentum to the buoyancy forces, allows the plume properties to be calculated in a step-by-step manner as the height

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above the release is incremented. Separate models have been produced for the ZOEF and the ZOSF as described in integral models for initial release and integral models for the region of established flow respectively.

The most complex models are represented by *Computational Fluid Dynamics (CFD)* or field codes which solve the Navier Stokes equations of fluid flow. Their advantage over integral models is that effects such as entrainment and turbulent transport of momentum are modelled directly and do not require the use of empirical constants. However, they still involve some modelling assumptions, as described in CFD models, and are more resource-intensive to run than integral or empirical models.

8. Empirical model, the most optimal

Striking a right balance between accuracy, uncertainty, cost effectiveness and user-friendliness, clearly, the simple empirical 'model' remains most favoured for use in risk assessments.

9. Validating the Empirical/cone plume model with lab-scale experimentation

Lab-scale experimentation was held at Department of Ocean Engineering, Indian Institute of Technology, Madras (IIT-M) for validating the Empirical/ Cone gas discharge plume model established by T.K.Fannelop & M.Bettelini in North Sea for Arabian Sea conditions.

In this study the available information on the bubble plumes, both theory and experiments was reviewed for the purpose of

Types of models	Accuracy	Uncertainty	Cost	User-friendliness
Empirical	Medium	Medium	Low	High
Integral	Medium	Medium	Medium	Medium
CFD	High	Low	High	Low

improving our prediction capabilities of small to medium releases which are common.

Fig 1: World-class wave basin facility at IIT-M. 30mx30mx3m deep equipped with Multi-Element Wave Maker (MEWM), 52 paddles capable of producing short and Long Crested Waves Maker (LCWM) capable of producing regular and random waves.

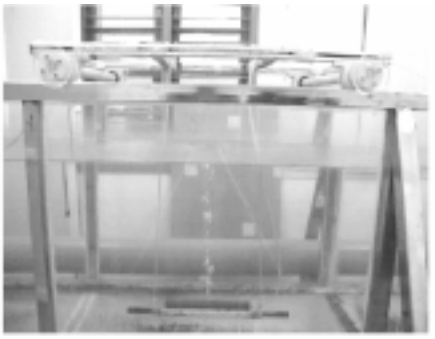
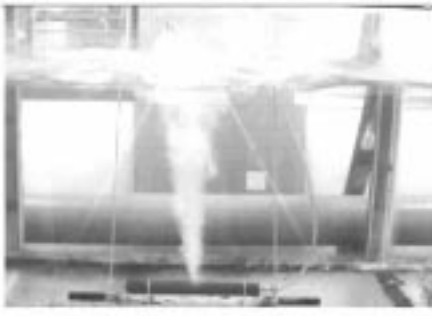


Fig 2: Test tank 2mx1.5mx1.25m height with graduation scales fitted for measuring plume height and diameter.

Fig 5.5.1: Plume behaviour at Depth : 1m
Flow Rate : 0.00253m³/s



ig 5.5.2: Plume behaviour at Depth : 1m
Flow Rate : 0.00505m³/s

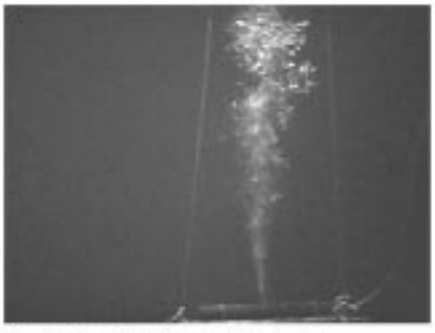


Fig 5: Plume behaviour at Depth : 1.5m
Flow Rate : 0.00758m³/s

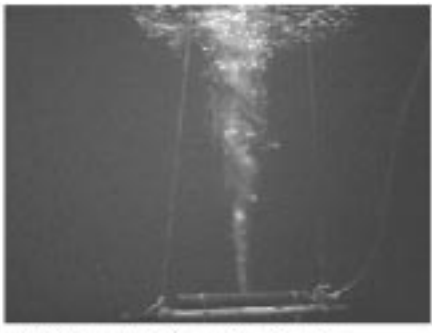


Fig 6: Plume behaviour at Depth : 1.5m
Flow Rate : 0.0112m³/s

10. Conclusions

Simple cone models assume either that the bubble plume occupies a cone of angle , or, equivalently, that the radius at the surface is a fixed proportion of the depth: i.e. b (z) =z tan (/2). This 'model' is illustrated in Fig.8 This cone angle is defined as that of the subsea

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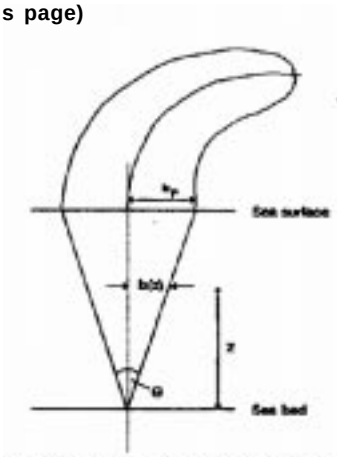


Fig 7: Subsea discharge based on simple cone model

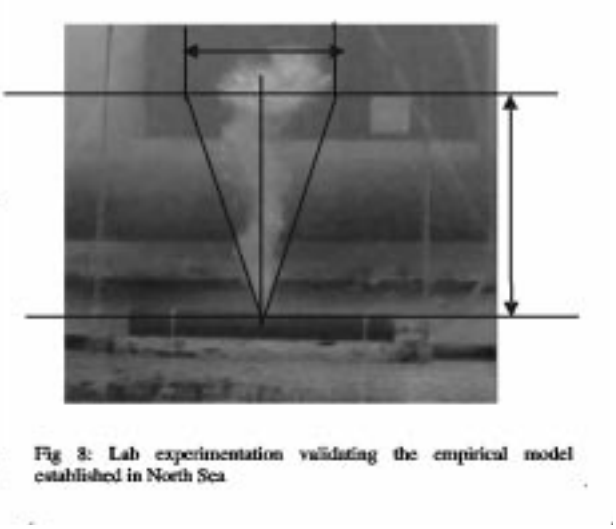
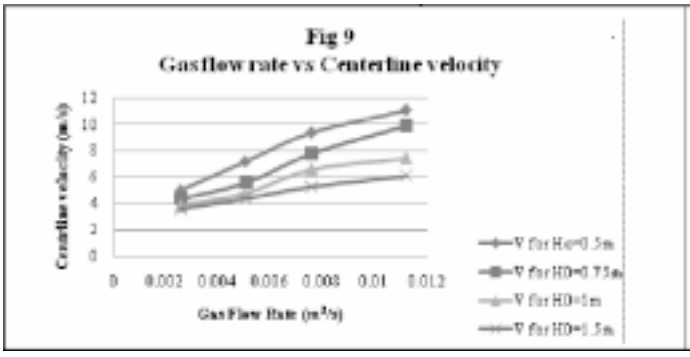
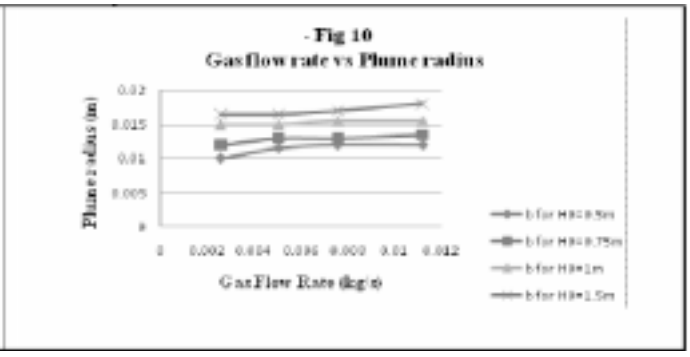


Fig 8: Lab experimentation validating the empirical model established in North Sea





plume and does not include the effect of radial flow, which is known to occur near the sea surface.

a. It is assumed that , and hence tan /2, are fixed parameters which do not vary with release rate or depth.

b. The value of the model constants used varies significantly. The cone angle is established as between 10-12°. Lower values closely match that of 10° there by validating the results established by Wilson, 1988 and Milgram and Erb, 1984 for North Sea.

c. The 'boil area', where the bubbles break through the surface, has approximately twice the diameter of the bubble plume as determined in the absence of surface interaction. This observation is confirmed by detailed measurements and justifies the use of cone angles even up to 230 as established by Billeter, 1989 and Fanne1op 1989 for North Sea.

FACTORY VISIT

Factory visit to Caterpillar India, Thiruvallur was arranged on Saturday 28th April 2012 to see the safety, health & environmental aspects followed in the factory. Large number of SEA India members participated in the visit and appreciated the H S E system followed by them.

HEXAVALENT CHROMIUM

Chromium hexavalent (Cr(VI)) compounds, often called hexavalent chromium, exist in several forms. Industrial uses of hexavalent chromium compounds include chromate pigments in dyes, paints, inks, and plastics; chromates added as anticorrosive agents to paints, primers, and other surface coatings; and chromic acid electroplated onto metal parts to provide a decorative or protective coating. Hexavalent chromium can also be formed when performing "hot work" such as welding on stainless steel or melting chromium metal. In these situations the chromium is not originally hexavalent, but the high temperatures involved in the process result in oxidation that converts the chromium to a hexavalent state.

Health Effects: Workers in many different occupations are exposed to hexavalent chromium (Cr(VI)). Occupational exposures occur mainly among workers who handle pigments containing dry chromate, spray paints and coatings containing chromate, operate chrome plating baths, and weld or cut metals containing chromium, such as stainless steel. Workers who breathe hexavalent chromium compounds at their jobs for many years may be at increased risk of developing lung cancer. Breathing high levels of hexavalent chromium can irritate or damage the nose, throat, and lungs. Irritation or damage to the eyes and skin can occur if hexavalent chromium contacts these organs in high concentrations or for a prolonged period of time. The following references aid in recognizing hazards and the health effects associated with hexavalent chromium in the workplace.

Cancer: All forms of hexavalent chromium are regarded as carcinogenic to workers. The risk of developing lung cancer increases with the amount of hexavalent chromium inhaled and the length of time the worker is exposed. Studies of workers in chromate production, chromate pigment, and chrome electroplating industries employed before the 1980s show increased rates of lung cancer mortality. Certain hexavalent chromium compounds produced lung cancer in animals that had the compounds placed directly in their lungs.

Eyes: Direct eye contact with chromic acid or chromate dusts can cause permanent eye damage.

Respiratory Tract: Hexavalent chromium can irritate the nose, throat, and lungs. Repeated or prolonged exposure can damage the mucous membranes of the nasal passages and result in ulcers. In severe cases, exposure causes perforation of the septum (the wall separating the nasal passages). Breathing small amounts of hexavalent chromium even for long periods does not cause respiratory tract irritation in most people. Some employees become allergic to hexavalent chromium so that inhaling the chromate compounds can cause asthma symptoms such as wheezing and shortness of breath.

Skin: Prolonged skin contact can result in dermatitis and skin ulcers. Some workers develop an allergic sensitization to chromium. In sensitized workers, contact with even small amounts can cause a serious skin rash.

Possible Solutions: There are several ways to reduce exposure to hexavalent chromium. Recommended controls vary from operation to operation. The preferred approach is to use engineering controls such as ventilation or equipment and process modification. If these controls are not sufficient, other controls may be implemented, including the use of respirators, eye protection, showering, and changing into street clothes before leaving the plant. The following references provide possible solutions for hexavalent chromium hazards in the workplace.

• Preventing Skin Problems from Working with Portland Cement. OSHA, (2008). Employees may suffer dermal hazards in working with wet cement such as cement burns (due to its caustic nature) and inflammation of the skin (either due to irritant or allergic contact dermatitis). This guidance addresses ways to prevent or minimize skin problems through the proper selection and use of gloves, boots and other personal protective equipment such as kneepads; proper skin care and work practices such as use of pH neutral or slightly acidic soaps; and ways of making cement products less hazardous.

• Small Entity Compliance Guide for the Hexavalent Chromium Standards [286 KB PDF*, 63 pages]. OSHA Publication 3320, (2006). Includes guidance on regulated areas, methods of control, respiratory protection, protective work clothing and equipment, hygiene areas and practices, housekeeping, medical surveillance, communication of hazards to employees, recordkeeping covered by the new standards and an extensive appendix of industry

(Contd. on next page)

What if countries could reduce risks from exposures to harmful substances by implementing sound chemicals management at all stages of production, use and disposal?

What if global and national agendas were driven by accurate, up-to-date information on the full costs and benefits of chemicals and waste products?

What if we could use strong international agreements to address or eliminate the most harmful substances, supporting national action to protect our planet's environmental resources and secure the livelihoods and health of future generations?

UNEP's Harmful Substances and Hazardous Waste subprogramme is working towards this vision during the 2010-13 period of UNEP's Medium-term Strategy. The sub-programme is built on more than 30 years of work in the field and is a driving force behind the sound management of chemicals and hazardous waste.

UNEP's vision is based on delivering scientific assessments of the release, transport and fate, and overall impact on the environment from harmful substances. UNEP will offer critical information on emerging risks from harmful substances and hazardous waste to inform debate on issues of international concern. UNEP will seek to monitor the progress towards the objective of global sound management of chemicals.

Effective management of chemicals and hazardous waste:

UNEP will assist States in the sound management of harmful substances and hazardous waste by delivering innovative approaches for all stages of their production, trade, use and disposal. UNEP will also provide leadership in promoting public access to information and knowledge on harmful substances and hazardous waste, raising awareness of their potential impacts on human health and the environment.

U N E P Vision for 2010-2013

Developing and implementing internationally agreed chemical management regimes.

UNEP will continue to support the development and implementation of internationally agreed chemicals management regimes through a range of services delivered globally, regionally and nationally. UNEP's work will include efforts in relation to mercury; lead and cadmium; persistent organic pollutants; pesticides; and industrial chemicals used in manufacturing. This work will be delivered in close cooperation with the secretariats of the major international conventions on chemicals and waste that are hosted by UNEP.

Hexavalent....

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operations or processes associated with occupational exposure to Cr(VI).

• ***NIOSH Pocket Guide to Chemical Hazards. National Institute for Occupational Safety and Health (NIOSH) Publication No. 2005-149, (2007, September).*** Provides physical description, exposure limits, measurement method, personal protection & sanitation, first aid, respirator recommendations, exposure routes, symptoms, target organs, and cancer sites.

• ***Occupational Health Guidelines for Chemical Hazards.*** National Institute for Occupational Safety and Health (NIOSH), (1981, January).

Contains information on identification, physical and chemical properties, health hazards, exposure limits, exposure sources and control methods, monitoring, personal hygiene, storage, spills and leaks, and personal protective equipment.

• Hexavalent Chromium. National Institute for Occupational Safety and Health (NIOSH) Workplace Safety and Health Topic.

Includes NIOSH comments in response to OSHA's request for Information, NIOSH databases, resources, health hazard evaluations and other related safety and health topics. ■

CASE STUDIES

CASE STUDY 1

Two workers killed in Boiler Explosion

Two people were killed when an explosion occurred in a acid cleaned boiler. The explosion occurred when an ordinary halogen lamp was inserted inside the boiler.

The most likely cause of the accident was the ignition of hydrogen gas that built up in the boiler steam drum. The hydrogen accumulation occurred because of inadequate ventilation arrangements to release the gas to atmosphere, as it evolved during the chemical cleaning procedure. As the steam drum door was opened, air was drawn in and combined with the hydrogen gas to produce a mixture between the hydrogen's Lower Explosive and Upper Explosive Limits. This potentially explosive gas was not ventilated to atmosphere, nor was the confined space of the steam drum tested for toxic or flammable gases in accordance with normal practice. As the non-intrinsically safe, halogen lamp was passed into the steam drum, either the high temperature of the halogen bulb or lens glass, or an electrical spark from the lamp, would have ignited the gas and caused the explosion.

Recommendations:

In most of the industries, heat exchangers and new equipments are acid cleaned using sulphuric acid. It should be ensured that the company employees as well as the contractor personnel who are doing the job are aware of the hazard of hydrogen generate in the process of acid cleaning. As it may be difficult to assess the explosive limit of the gases which are likely to be present, it is always advisable to release the gases to atmosphere which have evolved during the chemical cleaning process.

CASE STUDY 2

Worker caught in between Machinery parts of a Loader

A worker was fatally injured while performing functional checks on the hydraulics of a skid-steer loader. During the checking process, the hydraulic lift arm suddenly lowered. The worker's head was caught between the lift arm and the loader's body. He died on the spot.

Worker caught between lift arm and body of skid-steer loader

Recommendations*

1. Adhere to Safe Maintenance Procedures: Before attempting any repairs or functional checks on a machine, the person involved should ensure that the machine's ignition is off, the engine is completely shut down, and the ignition key removed. In addition, the operator should lower the lift arms and bucket and engage the parking brakes before getting off the cabin seat. There should be measures in place to prevent unintended or inadvertent activation of the machine.

2. Deploy Safety Devices: One should avoid performing maintenance or service under a raised lift arm unless a manufacturer-approved lift arm support has been properly deployed. In the event that the worker needs to conduct functional checks to the machine (i.e. working underneath the lift arm), ensure that the lift arm support devices, control interlock and physical safeguards on the machine are not bypassed, modified or removed.

3. Conduct risk assessment: Prior to the start of work, conduct proper risk assessment to adequately identify all potential hazards and the risks involved. Appropriate control measures and safe work procedures must be established, implemented and communicated to all involved personnel to mitigate the risks. Potential hazards for this incident include:

- Being caught or crushed by moving parts
- Failure of bucket-lift arm assembly (i.e. accidental lowering of lift arm)
- Failure of the hydraulic systems (e.g. hydraulic oil leaks)
- Unintended movements of the loader (if loader not properly parked or braked)

4. Establish Safe Work Procedures: There should be a set of established safe work procedures (SWP) that cover the operation, repair and maintenance of machines. It should also include handling emergency situations or non-routine events, such as the need for human-machine interface contact. Persons involved in the work should be adequately trained and familiar with the SWP such that the work can be carried out safely. ■

IN THE NEWS

Safety in Punjab University curriculum

After the continuous follow up and persuasion for the need of having road safety as a compulsory subject, Punjab State Road Safety Council finally got this included in the Panjab University curriculum from this session as 'Environment Education and Road Safety'.

As the subject will merge with one of the another compulsory qualifying subjects, 'environment education' that is to be changed to 'Environment Education and Road safety', the modalities for the course work have also been finalized said Dr Kamaljeet Soi , Vice Chairman, Punjab State Road Safety Council Government of Punjab.

“Several meetings took place and letters were written to university authorities pertaining to importance of awareness on road safety among the students,” informed Dr Soi. He further said the paper would be of 70 marks, environment education for 50 marks and remaining 20 for road safety and question paper for road safety will comprise of 20 multiple choice questions on ten topics that would be mandatory for the college students to attend ten lectures in a college on the subject.

“This will be implemented in all the affiliated colleges of Panjab University which are more than 160 in the region. The inclusion of road safety will not only instill skill set among the students but will also make them aware of the road safety rules,” said Dr Kamajit Soi. He hoped that all the universities would soon follow and include this important socio-economic aspect in their syllabi.

World Environment Day : 5 June 2012

Commemorated every year on 5 June, World Environment Day is one of the principal vehicles through which the United Nations stimulates worldwide awareness of the environment and enhances political attention and action. The aim of the day is to:

1. Give a human face to environmental issues;
2. Empower people to become active agents of sustainable and equitable development;
3. Promote an understanding that communities are pivotal to changing attitudes towards environmental issues;
4. Advocate partnership which will ensure all nations and peoples enjoy a safer and more prosperous future.

The host for World Environment Day 2012 is the Federative Republic of Brazil. The theme is Green Economy: Does it include you?

UNEP defines a Green Economy as 'one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.'

Practically speaking, a Green Economy is one whose growth in income and employment is driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. These investments need to be catalyzed and supported by targeted public expenditure, policy reforms and regulation changes.

But what does all this mean for you? Well, if the Green Economy is about social equity and inclusiveness then technically it is all about you! The question therefore asks you to find out more about the Green Economy and assess whether, in your country, you are being included in it.

World Environment Day 2012 marks the 40th anniversary of the event which was first established by the UN General Assembly in 1972 to mark the opening of the Stockholm Conference on the Human Environment.

IN THE NEWS

Safety officers must for Dubai construction companies

Construction companies and industrial firms in Dubai will soon have to appoint safety officers accredited by the emirate's civic body to prevent worksite accidents, officials said on Sunday.

The municipality's announcement follows as many as 50 deaths and more than 420 injuries in over 500 workplace accidents in the construction, industrial and infrastructure sectors last year.

The new regulation will come into effect by this year end and will specify the number of safety officers mandatory for companies depending on the number of their employees and risks involved in their operations, said Raed Al Marzouqi, who heads the Occupational Health and Safety Section at the Department of Public Health and Safety.

"The accredited safety officers will be responsible for overall safety aspects in their companies and they have to take preventive measures to avoid worksite accidents and hazards," said Al Marzouqi.

He said that these officers will be legally held responsible for lapses in safety at their worksites.

The official was speaking on the sidelines of a seminar held to mark the International Labour Day and the World Day for Safety and Health at Work.

Meanwhile, Alya Ismail Al Marzouqi, the head of Inspecting Entities Accreditation Section of Accreditation Department at Dubai Municipality, said the contractors and consultants in the construction sites must also get accreditation certificate from authorised entities.

In a statement issued on Sunday, Alya said that this certification was very important as it has a big role in ensuring the safety and security as well as reducing accidents at construction sites.

She said the decision followed one of the accidents at a construction site that resulted in big losses and injuries due to the fault in fixing the scaffolds by labourers.

Raed Al Marzouqi said the municipality was striving to build a safety culture in the emirate by asking companies to focus on safety training and best practices.

He said the "Safety for Sustainability" campaign of the civic body urges companies to invest in workers' safety and wellness so that the employers will not end up losing money and reputation due to accidents. The campaign asks the companies to consider their workers as their most precious asset.

This year's theme for the World Day for Safety and Health at Work is "Live Safe... Work Safe - Promoting Safety and Health in a Green Economy". The awareness materials being distributed on the occasion include do's and don'ts for workers, employers and their guests.

The municipality's safety alerts, which also highlight the rights and responsibilities of employees and employers, will be sent out to 26,000 companies registered with the e-government, said Al Marzouqi.

In addition, he said the municipality would distribute brochures and leaflets to companies mainly from the construction and industrial sectors. Another awareness programme will be held for the workers with the Dubai Municipality.

Source : Khaleej Times

ANNUAL GENERAL MEETING

NEWLY ELECTED EXECUTIVE COMMMITTEE MEMBERS

Sitting L-R: S/Shri N. Kumar, P. Janarthanam,S. Ulaganathan, M. Ravichandran, W.A. Balakumaran, G.M.E.K. Raj

Standing L-R: S/Shri G.S. Swaminathan, P. Subramani, K.G. Varadharajan, P. Manoharan, L. Sukumar, R. Kumar, RV. Sudhakar, G. Varadharajan

Mr. Martyn Gomersall, Chief Safety Expert, EMBYE (CMRL Project) delivering a special Technical talk on "Safety in Tunnelling Operations".

SAFETY ENGINEERS ASSOCIATION (INDIA) - MUMBAI CHAPTER

On 12th May 2012, Safety Engineers Association (SEA (I) - Mumbai chapter) quarterly meet was organized at Tata Power – Trombay for promoting safety with active collaboration and information sharing amongst Safety professionals. The meeting was inaugurated by Mr. P L Manjrekar, GM – Trombay and safety professionals from reputed companies like BPCL, HPCL, Clariant chemicals, RCF etc have attended. During the meeting, Tata Power's best safety practices were shared by Mr. L S V K S Murthy, Executive-Safety and subsequently site visit was organized.

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