**Introduction & Course Objective:**

Industries are part of a modern day essentials of any country. Irrespective of the size & type of industrial set-up, it will have basic two types of equipment (a) Rotary (b) Static or Stationary. While the Rotary equipment like Pumps, Turbines, and Compressors get due attention being rotating or dynamic in nature, at the same time the stationary equipment gets neglected or taken for granted to be available for its operation. Also during its maintenance, it gets lesser priority compared to rotary equipment during its regular / periodic outage & maintenance.

Since the static equipment are always taken to be available for operation, it is pertinent for the concerned persons in plants to know the basic aspects & features of these equipment which leads to safe operations of such equipment. Therefore the **Purpose & Scope of this two days deliberations is to arrive at basic understanding of some operating principles of static equipment, by developing understanding of some basic design aspects, typical construction & safety features & essential points to be taken care for its maintenance as well. This, in a way, really translates to “Safe Operating Principles” for faithfully managing the operations and its management of Static equipment.**
Introduction & Course Objective:

Now let us look at some of the major static equipment in any plant like Furnaces, Heat Exchangers, Vessels, Pipelines, and Valves etc. Each of these are designed for altogether different duties & services in any industry but are essentially expected to be available for operations for all the times. The only opportunity available for some of its maintenance is during its overall or turn around, else these are replaced. Some of these even do not have its standby too.

Industrial application or operational treatment, or both, if we relate to it the continued availability for its duty makes, shall lead us to think about how to avoid the problems encountered either in its use or while the equipment is discharging its duty.

Various industries have sometimes special uses for these equipment either as one of the very critical one or for general application. The shore-to-ship steam purity standards of industrial water systems and their uses can generally be described as under:

- **Furnaces**: Its uses various types of fuels for heating various feeds in industries, indirect food processing, and or power generation. These are also termed as fired heat exchangers. The combustion as process & its engineering is an important aspect of its safe operation.

- **Heat Exchangers**: These are non-fired heat exchangers, basically meant to improve overall thermal efficiency of the system. So it is important to understand its principles of design & operation to get best out of it.

- **Tankage**: These are meant to store various types of liquids, which may include hydrocarbons as well. These are very important static equipment as its failure could be disastrous for any industry. These storage tank are meant to store various liquid raw materials, semi finished & finished products. These are one time investment for an industry, any sudden failure can lead to non-availability of ullage resulting into reduction of production or even stoppage of the plant.

For any high hazard industry each of these equipment & its associated systems are technically industrial systems, but equipment remain Static mechanical equipment.

The need to treat these equipment within its limitation of design parameters of such systems needs to be recognized & well established; however, there are currently certain industrial standards in place, which govern its designs / types and application including its safe operating principles. These equipment being part of main systems often are to undergo abuse of operational practical problems.

Some of the aspects are part of initial design features & subsequently the industries go for higher through puts this leads for operating group to know carefully the limitation or margins of limits for achieving the newer targets or where to pinch the margins.

While normal operations are “smoother” the challenges are always during start up / commissioning & decommissioning. These aspects will also be discussed in brief.

In view of developing major projects & infrastructural facilities, the knowledge of these equipment industrial will play a very positive role to source, treat & manage the equipment. Fact also remains that with every passing year & decade, the quality of services deteriorate. To some extend these can be rejuvenated. On the contrary, this too had its own share of pathos with respect to availability of equipment & its handling during plant turn arounds.

In view of the foregoing it is pertinent & important for all industries using these equipment to appreciate & understand the problems associated with basic need of design aspects & treatment during the operation it needs to make the equipment safe.

In current days scenario this has become a dynamic subject & knowledge needs to be upgraded to keep abreast with current & future scenarios for industrial static equipment, its position of requirement in operation, practical limitation and treatments be offered in a cost effective manner.

It goes without mentioning that modern day industrial management techniques are to take advantage of newer technologies & innovations & run the associated plants, its static equipment and associated systems in most effective & efficient manner.

**This interactive course is dedicated to create platform & to look at whole process of static equipment management for industrial application.** It could be furnace system, tankages, heat exchangers, piping systems & valves. It also will have an overview of important pre-commissioning & decommissioning a thrust to learn.
Meet Your Expert Coach: Mr. G. S. Baveja / Guest Coach: Mr. Ratan Mathur

Meet Your Expert Coach: Mr. G. S. Baveja

Mr. Baveja is a mechanical engineering graduate of 1970, with meritorious educational background, having more than 44+ years of professional & management experience. Prior to his retirement, he served Bharat Petroleum Corporation Limited (BPCL) for over 26 years and led various departments including “Major Projects”, “Engineering & Construction”, “Materials”, “Energy & Environment” and “Advisory Engineering”. Lastly he was Corporate Entity Head of HSE in the rank of General Manager. During his tenure with BPCL, he was Project Manager to procure & install a combined cycle Captive Power Plant (Two Units of Gas Turbine Based Generators with HRSGs) under World Bank financing. While head of “Engineering & Construction” department, he led the “Project Engineering”, “Drawing & Design”, “Contracts” and “Construction” teams. During this tenure many Balance of Plants (BOP) projects and facilities were executed from concept to completion, as in-house projects, like Raw water / Cooling Water system, Augmentation of Fire Protection & Fire water network system, plant air compressors, DM Plant, Fuel & Crude Oil Storage Tankages etc. which were tied up with main plants during major turnarounds.

Prior to joining BPCL, for about 12 years he worked for Bharat Heavy Electricals Limited (BHEL), with its Power Projects department and was engaged in construction, erection and commissioning of Thermal Power Plants at various locations in the country. This experience was very intense. His assignments precisely covered the installation, commissioning of TG sets & its associated auxiliary systems. He had opportunity to work on plants of varying capacities of individual machines from 30MW to 500 MW with its associated auxiliaries at different locations within the country. While in BHEL, he worked on power plants at 30 MW Parli TPS, Maharashtra; 120 MW Santaldih TPS, West Bengal; 220 MW RAPP, Kota, Rajasthan; 120 MW Chandrapura TPS, DVC; 210 MW Bandel TPS, West Bengal and 500 MW Trombay TPS, Maharashtra.

For six months he underwent a training programme for Erection of large size machines at M/s KWU in West Germany, wherein he was exposed to an individual machine of 800MW.

The core competency of Mr. Baveja is his ability to offer an array of best in class training with accent on real life situations using techniques like case-studies, simulation exercises and various other structured or spontaneous pedagogic tools.

Mr. Baveja is a qualified “Assessor” for Sustainability Excellence, based on the material from European Foundation for Quality Management. He has passion for Water conservation. He worked with M/s Det Norske Veritas (DNV) as a “Consultant & Safety Auditor, DNV’s Energy-India (Region Asia & Middle East).

He serves as “Panel Member” on many Government & non-Governmental committees. He chaired sessions in National & International seminars on varying subjects. His passion for quality during installation made him to be one of the co-authors to develop the first ever “Field Quality Assurance” manual for TG sets.

He has been a regular speaker in Conferences /Seminars around the world. He has been a Trainer to conduct training programs on various topics with M/s Saga Global Consultants Ltd, India; National Safety Council of India; Institute of Petroleum & Energy Studies, M/s IDC Technologies Pvt. Ltd., India and M/s UE Technologies, Abu Dhabi, M/s Knowledge Resource CS, Abu Dhabi etc.

He conducted many training programs for participants from Khartoum Refinery Co., both in India and at Sudan, in the areas of Utility, Boiler Operations, Gas Turbine based power plants etc. A set of training programs titled “Safe Operating Principles” were conducted for about 260 participants from ORPIC, Oman, wherein major thrust was with respect to “Rotary & Static Equipments of Refineries”. GE Technology Centre engaged him to conduct an in-house training for their design engineers on “Principles on operations, design & maintenance of Compressors”. A series of Open house training programs are conducted on this topic. A series of open-house programs are conducted on Industrial Water Management. All these programs also have a common equipment called “Pump”.

Meet Your Expert Coach: Mr. G. S. Baveja

Industrial Static Equipments & Its Safe Operating Principles (With Static Electricity Hazard – Causes and Amelioration)
Meet Your Expert Coach:
Mr. Ratan Mathur

An Electrical engineer with 40 years experience in Electrical projects and Power Electronics:

Education and certification:

✓ B.Sc (Elect. Engg.), 1972, Institute of Technology, Benaras Hindu University.

✓ Certified Energy Auditor Exam, 2005, Bureau of Energy Efficiency, New Delhi, Ministry of Power Govt. of India.

Current professional status:

✓ Instructor and writer for industrial training courses. Since 2007: conducting on site and public courses on, Electrical Safety and Electrical power engg. subjects. Have conducted electrical safety and ARC flash assessment training at NTPC Ramagundam, OPGC Jharsu guda, Orissa, Tata steel. And other reputed organizations.

✓ Member expert panel, National safety council of India (NSCI) New Bombay Since 2008 for conducting safety audits in industrial installations and training programs on electrical safety.

✓ Have conducted more than 50 safety audits in power stations, cement, steel, petrochemical, automobile, engineering and other plants.

✓ Working as consultant for Hazardous area classification.

1992-2004: Own set up at Nasik for system integration projects involving Siemens PLC’s and Drives.

Program Schedule for two days

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>09:30 am</td>
<td>Registration &amp; Breakfast</td>
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<tr>
<td>10:00 am</td>
<td>Course Commences</td>
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<tr>
<td>11:30 am - 11:45 am</td>
<td>Tea Break</td>
</tr>
<tr>
<td>01:00 pm - 02:00 pm</td>
<td>Lunch</td>
</tr>
<tr>
<td>03:30 pm - 03:45 pm</td>
<td>Tea Break</td>
</tr>
<tr>
<td>05:30 pm</td>
<td>Course Ends</td>
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</tbody>
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Customised Training Solutions is the in-house training division of IBC

Our Customised Training Solutions team are veterans of in-house training with a portfolio of specialists unrivaled anywhere in Asia Pacific! To design your training project with significant business impact, please contact Mr. Ronit Kapur: +91 98203 54333
Email: ronitkapur@ibcinfo.org / inhouse@ibcinfo.com
**Introduction to Industrial equipments:**
- Types of equipment for Industrial applications.
- Basis for design of Static equipment.
- Broad Operating principles or philosophy for Static Equipment.

**Furnaces:**
- Types of furnaces & usages or application in Industry.
- Design basis & standards.
- Parts of furnaces & its special features.
- Erection & assembly of furnaces.
- Quality assurance during construction.
- Refractory Application.
- Burners & other appurtenances.

**Combustion Science:**
- Basics of combustion.
- Types of combustion & fuels.
- Types of burners.
- Flame Patterns.

**Furnace Operations:**
- Pre-commissioning checks.
- De-commissioning of furnaces.
- Safe operations & troubleshooting.

**Closing Session (Q&A).**

**Heat Exchangers (HE):**
- Types and selection of HEs.
- Basis for design of HEs & appreciation to TEMA standards.
- Heat Exchange.
- Constructional features & assembly of Heat Exchangers.
- Commissioning & de-commissioning of HE.

**Tankage:**
- Types of storage tanks & its application.
- Likely limitations.
- Basic design features.
- Construction of Storage Tanks & quality control.
- Safety features & Instrumentation.
- Taking into services of Storage Tank.

**Activity:**
Group Discussions.

SESSION ON:

**Static electricity hazard – Causes and amelioration.**
Static electricity hazard – Causes and amelioration:

- Static electricity presents a serious risk of fires and explosions in certain industrial processes.

- There are three primary ways in which static electricity gets generated:
  - Separation of electrical charges when two dissimilar materials come in contact fast and separate (tribo-electricity).
  - Electrostatic induction.
  - Spraying of charges.

- The processes where the above phenomenon could happen involve handling, storage, transportation, dispensation and processing of liquids, gases, vapours and powders.

- The risk of fires and explosions gets greatly magnified when the material handled are of flammable/combustible characteristics and/or the environment is of explosive nature.

- The electrical discharges caused by static electricity are categorized as spark/corona, brush discharge, propagating brush discharge and cone discharge.

- A realistic risk assessment for static hazards requires a thorough investigation of the processes, flammability characteristic of the material involved and the environment.

- Various international standards define the limiting values for classifying the flammability/ignition characteristics of material such as flash point, auto ignition temperature, minimum ignition energy, volume resistivity (for plastic materials) etc.

- Based on risk perception, type of processes and potential causes of static generation a number of possible mitigation and control measures such as follows would need to be implemented:
  - Proper earthing and bonding of metallic/conducting surfaces.
  - Use of anti static plastic FIBCs and RIBCs for powder handling.
  - Ionization and humidity controls.
  - Anti static floorings.
  - Safe practices in operation and maintenance.

CLOSING & CERTIFICATION
Yes! Please register the following delegates for Industrial Static Equipments & Its Safe Operating Principles 
(With Static electricity hazard – Causes and amelioration) 

FOR ADDITIONAL DELEGATES PLEASE PHOTOCOPY THIS FORM

Company Name: ...........................................................................................................................................
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Pin: ___________________________ Tel: ___________________________ Fax: ___________________________

PERSONAL DETAILS

Name: ___________________________ Job Title: ___________________________ Department: ___________________________

Payments in full is required in advance or at the time of registration. Payment is required within 5 working days of receipt of invoice. Please note that full payment must be received prior to the event.

IBC CANCELLATION, POSTPONEMENT AND SUBSTITUTION POLICY:

- If you have any questions or concerns regarding the conference, please contact us immediately. We are here to assist you with any issues that may arise.

Please note that the above information is subject to change without notice. Please check the website for the most up-to-date information.

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