# ENGINEERING STAFF COLLEGE OF INDIA

Autonomous Organ of The Institution of Engineers (India)
(IMS [ISO 9001:2015, ISO 14001:2015, ISO 50001:2018, ISO 45001:2018],
ISO/IEC 17025:2017 Certified, AICTE & CEA Recognized Institution)
Old Bombay Road, Gachibowli, Hyderabad – 500 032. Telangana, India

**Management and Technology Division**

**Hybrid (Offline & Online) Continuing Professional Development Programme on**

# Maintenance and Troubleshooting of Hydraulics and Pneumatics Systems

**Dates: 06 – 09 August 2024**

**at ESCI Campus, Hyderabad**

## INTRODUCTION

Electrical energy is the primary energy source used for running equipment and machinery in modern industries. However, in spite of the availability of highly innovative electrical drives and devices, realizing most of the mechanical movements in machines/equipment like even simple reciprocation (or, oscillation) of components, handling of heavy loads in confined spaces, etc is almost impossible by direct electrical means. To achieve such actuation of machine components, drives run by pressurized fluids can be most conveniently employed – thus the fluid power drives or transmissions assume priority.

If the fluid is a gas like air, nitrogen, etc., it is called a pneumatic system. And, if the fluid used is a liquid like water, oil, emulsion, etc., it is called a hydraulic system. The basic difference between the two is that whereas the gases are compressible the liquids are considered incompressible (in most practical applications). Another contrast is while the gases are easily let out into the atmosphere from the system, the liquids are filtered/cleaned and recycled within the system. A typical fluid power system begins with a pressurizing unit like an electrical pump, or compressor and essentially comprises of fluid preparation units, control valves, and actuators.

Over the period, the fluid power technology has evolved extensively, and into amazing sophistication and has become an inevitable part of almost any modern industrial machine. Such applications include heavy excavators, hydraulic cranes, material handling equipment, jacks, brakes, packaging units, hazardous processes, clean processes, pharmacy, food processing, pick-and-place mechanisms, job feeders, stackers, robots, etc.

This programme covers the Hydraulic & Pneumatic systems, right from the theoretical concepts to the modern products available in the market, to their selection, installation, operational & maintenance issues, standards applicable, etc.

## OBJECTIVES

The main objectives of the programme are:

- To bring out an overall concept of Fluid Power Technology.
- To provide information on standard graphical symbols of the fluid power circuits components.
- To impart a working knowledge about the hydraulic and pneumatic systems employed in present day industrial equipment and machinery.
- To expose the participants to an understanding of fault tracing, troubleshooting the hydraulic/pneumatic circuits and their components.
- To enable the participants to raise indents from a study of the given circuits.

## COURSE COVERAGE

- Fundamental Principles Governing Fluid Flow Systems
- Hydraulic Pumps & Pressure Regulation
- Hydro State Transmissions
- Valves & Auxiliary components
- Air Compression, Air treatment and Pressure regulation
- Rotary & linear actuators
- Temperature & Contamination Control
- Hydraulic & Pneumatic Accessiones
- Process Control Pneumatics
- Safety, Fault finding and preventive maintenance
- Troubleshooting of Pneumatics Systems – Common Issues (Operating Pressure Issues, Voltage and Power Issues, Environmental Issues, Mounting Issues and Poor Air Quality Issues etc.)
- Troubleshooting of Hydraulic Systems – (Motor, Pumps, Seals, Fitters & Valves)
- Typical Systems
  - Defense
  - Aerospace
  - Processing industries

## METHODOLOGY

Methodology of the programme includes class room Sessions with Lecture/discussion with audio visual aid, benched marked practices if any, video shows, Chalk & Talk sessions, group discussions, case studies, debates, sharing of experiences, etc. All the sessions will be interactive demanding active participation from all the members. Case Method of Instructions will be the main method of knowledge facilitation. Technical Field and Social visits are integral part of the training methodology.

## TARGET PARTICIPANTS

Engineers and Professionals from Manufacturing Industry, Fertilizers, Power Sector, Refineries, Petrochemicals, Agricultural Equipment, Medical Equipment, Lifts, Jacks, Jigs & Fixtures manufactures, Hydro power, Irrigation Department, Cement Industries, Scientists working in Research Laboratories, Controls & Instruments/Operations & Maintenance teams / fresh GET's & DET's / Foremen / Supervisors etc. Fresh GET's & DET's can get well-groomed from this module.

## BENEFITS TO THE PARTICIPANTS

- Gain a clear understanding of fluid power controls & systems.
- Gain ability to build, draw & understand basic circuits.
- Gain ability to read simple hydraulic & pneumatic circuits to prepare indents from them.
- Gain an ability to track faults and carry out troubleshooting.
- Understand importance of energy savings achievable by application of fluid power systems for automation

## EXPERT FACULTY

1. **Mr. K. Krishna Murthy**
   Formerly Head Technical Training, Coromandel International Limited.
   *Author: "Why Industrial Bearings fail?", "All In One of Manual Of Industrial Piping Practice and Maintenance", Industrial Press, New York, USA.*
2. **Dr. E.V.Suryanarayana,**
   Formerly Additional GM (Engg. Services), Mishra Dhatau Nigam Limited , Hyderabad

The faculty consists of experts from industry, research establishments and academia besides that from ESCI.

## PROGRAMME DIRECTORS

**Dr. R.S.S. PRASANTH,** *F.I.E..*
Sr. Faculty & Head
Management & Technology Division,
Engineering Staff College of India
Old Bombay Road, Gachibowli, Hyderabad - 500032
Mob: 09897020919 / Ph: 040-66304111/4112/4105
Email: mtmkt@escihyd.org/mt@escihyd.org

**Dr. KATTI BHARATH** *M.Tech, Ph.D.(NIT-W)*
Faculty
Management & Technology Division
Engineering Staff College of India
Old Bombay Road, Gachibowli, Hyderabad– 500032
Phone: 7097282619040-66304111/4105
Email: mt@escihyd.org,mtmkt@escihyd.org

## PROGRAMME DATES & TIMINGS

**Dates: 06 – 09 August 2024**

**Timings:** On the first day Registration will commence at **09:00 Hrs**. On all other days the programme timings will be from **09:45-17:15 Hrs** with breaks in between for tea and lunch.

## COURSE FEE:

**Rs.22,000/- (Rupees Twenty Two Thousand only)** per Participant + GST@18% Extra. Fee includes, course material, course kit, twin-sharing/single AC accommodation as per availability, breakfast, lunch, dinner, tea / coffee and snacks during the actual days of training programme.

**Online: WebEx platform**

**Rs. 12,000 /- (Rupees Twelve Thousand only)** per participant + GST@18% Extra. Fee includes, course material, course kit & Institute overheads.

## DISCOUNTS

- **Non-Residential Fee:** 10% discount on course fee is allowed for non-residential participants.
- **Group Discount:** Additional 10% discount for three or more participants if sponsored by the same organization.

**Note: GST Nil for Central Govt. Departments (like DRDO, DGQA & Govt. Departments).**

Programme fee is to be paid in in favor of **"THE INSTITUTION OF ENGINEERS (INDIA) – ENGINEERING STAFF COLLEGE OF INDIA"** in the form of demand draft payable at Hyderabad. Alternatively, the payment may be made by Electronic Fund Transfer (EFT) to ESCI - **SB A/c No.0432104000039631 with The IDBI Bank Ltd., Gachibowli Branch, Plot No. 2-53/2, JNIBF, IIIT Junction, Gachibowli, Hyderabad-500032 by RTG's/ NIFT / IFSC Code No: IBKL0000432.** While using EFT method of payment, please ensure to communicate us your company name, our Invoice reference and programme title.

## CERTIFICATION

A Certificate of participation will be awarded to each participant on conclusion of the programme.

## GENERAL INSTRUCTIONS:

- ESCI encourages participants to present case studies from their respective organizations.
- ESCI provides complimentary accommodation and boarding to the participants one day before commencement (Check-in 1200 h) and one day after conclusion (Check-out 1200 h) of the programme duration. Overstay charges will be applicable as per ESCI rules (subject to availability of accommodation).
- Well-developed Information Centre and Internet facilities are available to the participants free of cost.