

Capability in Electrical Safety Services

Leaders in
Risk Engineering and
Safety Solutions

An ISO 9001:2008
CERTIFIED CONSULTING ORGANISATION



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ABOUT US



Cholamandalam MS Risk Services Ltd., is a 50:50 joint venture between the INR 300 billion Murugappa Group and Mitsui Sumitomo Insurance Group, Japan. With over 175 risk engineering experts, we are the largest employer of Environment, Health & Safety specialists in India and offer comprehensive risk management and engineering solutions.

With two decades of experience and over 8000 consulting projects we are able to offer best in class, customized services to organizations to optimize their EHS performance, and set new benchmarks in safety performance.

We are also strengthened by our strategic partnerships with Arcadis, a global EHS consulting company ranked 5th in the world, and our associate status with Inogen, a global corporation providing multi-nationals with consistent and sustainable EHS and safety solutions world wide.

We excel in providing a spectrum of services across the lifecycle of a project - from the conceptualization stage, to design, until decommissioning be it in Environment Management and Sustainability, Process Safety, Electrical Safety, Logistics Risk Consulting and Construction Safety.

Since our inception we've had the experience gathered from across 42 sectors including Automobile, IT/Telecom, Pharmaceuticals, Fertilizers, Chemical, Power Plants, Oil & Gas, Cements, Construction, Textile, Retail etc.

Chola MS Risk Services also offers EHS Training, Competency building and Assessment services through its Safety Academy. Besides offering Classroom based training for Corporates, it extensively uses the power of technology to run virtual classrooms, blended learning and online e-learning courses on a wide variety of subjects in risk engineering and safety.

CORE CONSULTING DOMAINS



Process Safety



Environment Consulting



Electrical Safety



Construction Safety



Insurance Support Services



Logistics Safety

GREAT VISION. GREAT TEAM.

An agile organization with a team of over 175 dedicated and highly specialized engineers. Our Leadership team has specialist work experience of 15 - 25 years, with an eminent reputation for sheer technical excellence.

Our HR philosophy and mission is to create a positive work environment. We take pride in the culture of innovation and commitment to customer delight.

- ▶ 175 strong
- ▶ 65 team members with over 10 years of work experience
- ▶ From the best colleges in India
- ▶ OSHAS 18001/ISO 14001 certified lead auditors
- ▶ Accreditation from NABET
- ▶ IEC Ex certified professionals
- ▶ Safety auditors certified by DGFASLI
- ▶ 5 FAE consultants
- ▶ Certified Level I & Level II Professional Thermographers
- ▶ Certified Functional Safety Experts
- ▶ Certified EIA coordinators
- ▶ BEE certified energy auditors



AIChE

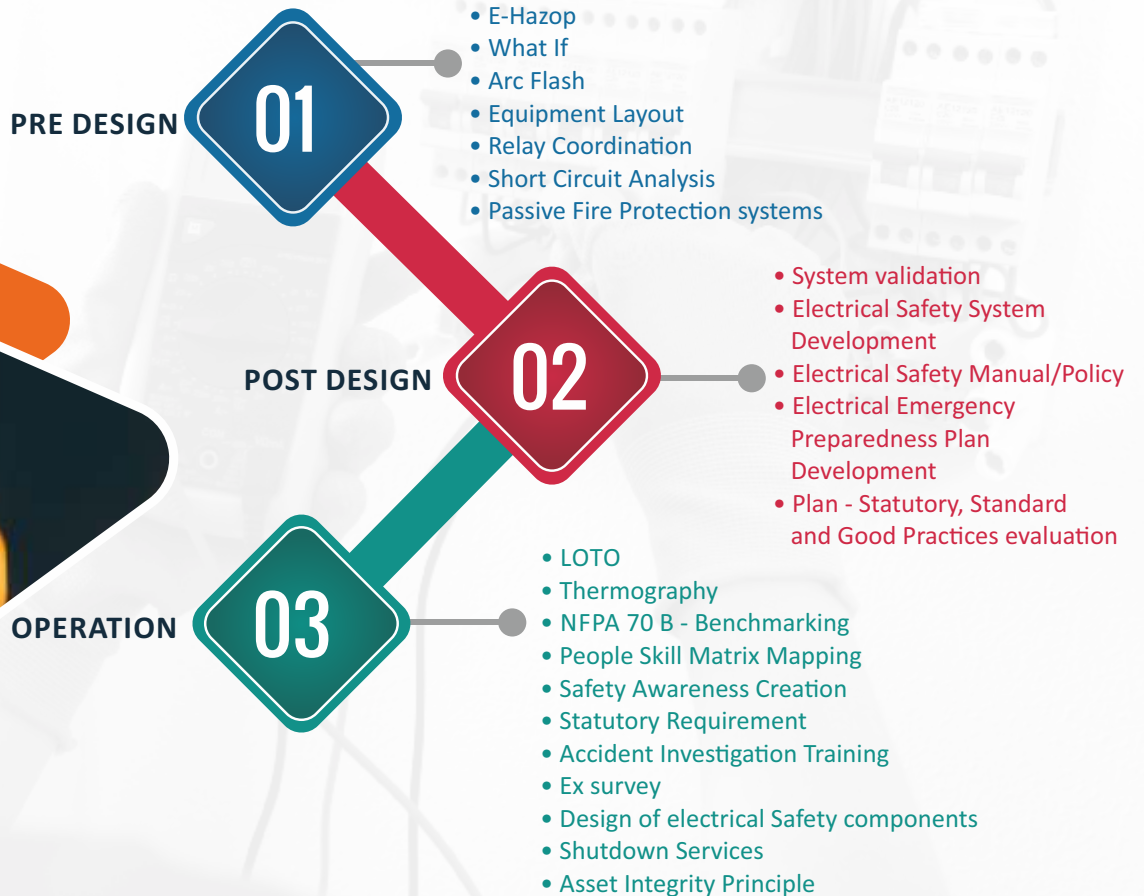


TÜVRheinland®
Precisely Right.

MOVING TOWARDS EXCELLENCE

Safety as they say is priceless and does not come easy. It requires careful and sustained intervention to reach excellence. It does not matter at what phase or stage you are in your safety maturity model, we can step in and work alongside you to bring in the right interventions to ensure you see the right benefits.

Elements of a world class electrical safety system



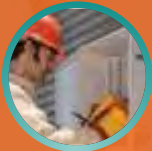
ELECTRICAL SAFETY PORTFOLIO OF SERVICES



Power Quality Study



Static Electricity Hazards Study



E-Hazop



Arc Flash and Relay
Coordination Study



Lightning Protection
Design and Review



Thermography Study



Electrical Safety Audit



Hazardous Area
Classification



Electrical Safety Audit

Electricity is an integral part of the modern world, and sometimes it is easy to forget just how dangerous it can be. The NCRB report since 2012 to 2015 reveals that Fire accidents due to just Electrical Short Circuits itself accounts for 6%-13% of the total Fire accidents. In most states in India the property lost due to fire & electrical accidents are worth anywhere from 25 - 50 crores each year. Electrical installations often fail or malfunction because of inappropriate practices and a poor knowledge of safety and risk mitigation measures, and therefore fire and electrical hazards continues to be one of the foremost causes for massive loses and fatalities every year. With electricity becoming an indispensable part of our life managing it is inevitable.

Typical Scope & Methodology

- ▶ Verification of statutory compliance with respect to Indian electricity rules
- ▶ Physical inspection to identify electrical hazards, including static electricity hazards
- ▶ Review of lightning protection systems & earthing systems
- ▶ Review of hazardous area classification & selection of flameproof equipment
- ▶ Review of electrical systems & procedures, preventive maintenance systems, electrical accidents & near misses
- ▶ Identifying areas of overloading by carrying out load current measurements
- ▶ Hotspot detection using infra-red hot spot detection equipment/ thermal imaging

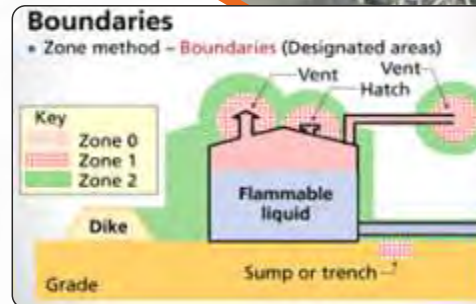
Hazardous Area Classification Study




Industries handling, processing or storing flammable chemicals are exposed to fires & explosion hazards due to their combustible properties. Periodic HAC review of hazardous industries is very critical considering the possible process changes, equipment replacements, etc. The critical design aspect such as temperature classification is seldom considered in pharmaceutical plants. Since HAC is a designer's job, the plant O&M engineers would most likely not be aware about the finer aspects of HAC and tend to violate the fundamental rules of HAC, resulting in major fire & explosion accidents.

Typical Scope & Methodology

- ▶ Analyzing and classifying the environment into different zones where explosive gas atmosphere may occur to facilitate the proper selection of electrical apparatus to be installed in the environment.
- ▶ To review the Hazardous Area Classification (HAC) in the plant (on a sampling basis) against the existing HAC drawings/documents, based on IEC 60079-10 and IEC 60079-0.
- ▶ To review the electrical equipment installed in the plant (on a sampling basis), based on IS 5571 (type of protection, Temperature classifications, Gas groups).
- ▶ To review the electrical equipment maintenance practices followed in the plant against IEC 60079-14 and IEC 60079-17 (part III).
- ▶ Comprehensive HAC review report with recommendations and implementation priority.
- ▶ CAD drawings with re-classified areas plotted.



Lightning Protection Systems Design and Risk Assessment



Lightning strikes on a plant or building can be extremely disastrous. It can be intensely harmful to both life and property and therefore its impact should be limited. Lightning doesn't always strike the highest point. A Lightning Protection System (LPS) is designed to protect a structure or building and its contents from damage caused by the intensely high voltage currents of a lightning strike. A lightning protection system offers a lightning strike a low resistance path to ground where the enormous energy is then safely dispersed. Lightning can be unpredictable and a well designed lightning protection system will take this into consideration. It will be designed so even if lightning does strike the building's structure first, its large voltage currents will be drawn into the lightning protection system before any serious damage or harm can be done.

Fortunately there are techniques and methods to safe guard against threats from Lightning. However, Lightning protection studies need to be highly site specific and designs need to be customized to individual facilities and structures. Our comprehensive lightning risk assessment study offers you just that.

Typical Scope & Methodology

- ▶ Risk assessment to determine the need for each structure
- ▶ Evolve lightning protection systems specific to each structure
- ▶ Study existing surge protection systems and suggest modifications, if required
- ▶ A detailed report including prioritization of structures for erection of lightning protection systems
- ▶ A detailed report with 3D layout and plot plan detailing the Lightning protection scheme

Arc Flash Study

Arc flash is one of the common dangers while working with electricity. An arc flash is the light and heat produced from an electric arc, supplied with sufficient electrical energy, to cause substantial damage, harm, fire, or injury. Arc Flash happens when electric current flows through an air gap between conductors. There are several ways this can happen but the most common occurrence is when conductor insulation is worn or broken down. Arc Flash Analysis identifies and analyzes high risk arc flash areas in your electrical power system.

Typical Scope & Methodology

- ▶ Collect the system Installation and equipment data
- ▶ Determine the power system's modes of operation
- ▶ Determine the bolted fault currents
- ▶ Determine the arc fault currents
- ▶ From the protective device characteristics, Find the Arcing Duration
- ▶ Record the system voltages and equipment classes for each bus or arc hazard location
- ▶ Determine the working distance
- ▶ Determine the incident energy
- ▶ Determine Flash protection boundary for all equipment
- ▶ Protective device coordination evaluation for bolted fault as well as arcing fault
- ▶ Generate Arc Flash Hazard labels



Electrical Hazardous Operability review [E-Hazop]

E-Hazop is the application of a series of technical examinations and audits to assess hazard potential to personnel and plan of mistaken operation of a system or malfunction of individual components and consequential effects including operator error.

E-Hazop is made up of three modules

- ▶ **SAFAN – Safety Analysis**
 - Critical analysis of high voltage installation hazards to safeguard equipment and personnel.
- ▶ **SYSOP – System security and operability**
 - Systematic review of engineering design to identify possible limitations and lack of flexibility with their consequences to operability and overall security of the system.
- ▶ **OPTAN – Operator task analysis**
 - Identifying facilities and skill levels required to carry out the operation in a safe manner during normal and abnormal conditions.

Typical Scope & Methodology

- ▶ Assess and minimize types of potential hazard presented to personnel in the vicinity of electrical installations.
- ▶ Provide a critical review of both network design and plant to be installed and assess any limitations and their effects on both operability and security of the overall system.
- ▶ Analyze tasks set for operators assess facilities and instructions provided to undertake these tasks and recommend measures to avoid operator error.



Thermography using Drones

[For Aerial Thermographic Survey]

An infrared camera detects temperature difference in photovoltaic module and visualizes them in a thermal image.

For example, solar should be an example of this scope. During normal operation, thermal images of a properly functioning photovoltaic module will show homogeneous temperature distribution in the module. If a module is faulty, significant temperature differences can be seen in individual cells or all of the module's cells. Therefore detection of errors with high definition thermal imaging cameras mounted on photovoltaic drones is an efficient and cost-effective way to ensure sustained profitability of a photovoltaic system.

The thermal image illustrates common issues with defective cells and substrings.

- ▶ Non-functioning panels due to incorrectly wired panels or worn & defective cables
- ▶ Delamination due to external damage or substandard solar panel quality
- ▶ Short circuits in a cell string
- ▶ Cell crack or other impediments
- ▶ Cell rupture



TRANSFORM YOUR SAFETY TRAINING INTO AN EXTRA ORDINARY EXPERIENCE

At the Chola MS Safety Academy we have the experience gained from over 8000 consulting assignments in Risk Engineering & Safety, spanning two decades from across the world. We also have a team of passionate trainers who are certified Safety Auditors (DGFSALI), Certified Functional Safety Experts, QCI approved environment experts, ROSPA certified trainers, Certified Level II thermographers etc. The cumulative experience of our domain experts and up-to-date knowledge about status, regulations, standards, global and local policies form the basis of our program. We have the experience of having delivered 5000 training hours. Some of our popular programs include the following.

- ▶ Safe LOTO
- ▶ Beyond Statutory Requirements & Regulations
- ▶ Fire & Emergency Management
- ▶ e-HAZOP
- ▶ Confined Space Entry
- ▶ Understanding HAC
- ▶ Lightning Protection & Earthing Safety
- ▶ Arc Flash Study
- ▶ Core Principles of Electrical Safety



A FEW CREDENTIALS

- ▶▶ First Asian company to be accredited by Kuwait Oil Company (KOC) to carry out specialized Process Safety Studies under 31 S category
- ▶▶ OHSAS 18001 / ISO 14001 certified Lead Auditors in the team
- ▶▶ Certified Safety Auditors by DGFASLI (Directorate General, Factories Advice Service & Labor Institutes, Govt. of India)
- ▶▶ Certified Functional Safety Expert from Exida & Functional Safety Engineer certified from TUV Rhineland
- ▶▶ Closely working with CCPS for PSM initiatives in India & Organized the 8th CCPS Asia Pacific Regional Meeting in association with CCPS in Chennai
- ▶▶ Part of a functional committee of Industry experts constituted to frame the Oil Industry Safety Directorate (OISD) 'Guidelines for Carrying out Quantitative Risk Assessment of Oil & Gas Installations' in India
- ▶▶ Closely working with EXIDA on Functional Safety
- ▶▶ Recognized by the Pharma Supply Chain Initiative (PSCI), London as a professional Independent third-party audit firm
- ▶▶ Presented paper at the CCPS 1st Asia Pacific Conference on Process Safety at China "Implementing PSM in India"
- ▶▶ Wide expertise in process safety studies including executing HAZOP, QRA, SIL Assessments, Gap Analysis Studies & Safety Audits for major Oil & Gas companies in India and Overseas.
- ▶▶ Pioneers in the field of Electrical safety in India, inception of the team in 1994
- ▶▶ Pioneered the development a Safety ranking and scoring system for various industries with respect to Electrical safety
- ▶▶ Audited over 1000 commercial offices & high rise buildings in a India
- ▶▶ Preferred training partners and auditors for top listed MNCs in India
- ▶▶ Only organization in India to have engineers certified by IEC Ex for hazardous Area



A way forward for a Non Fatal & Injury Free Work Place

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